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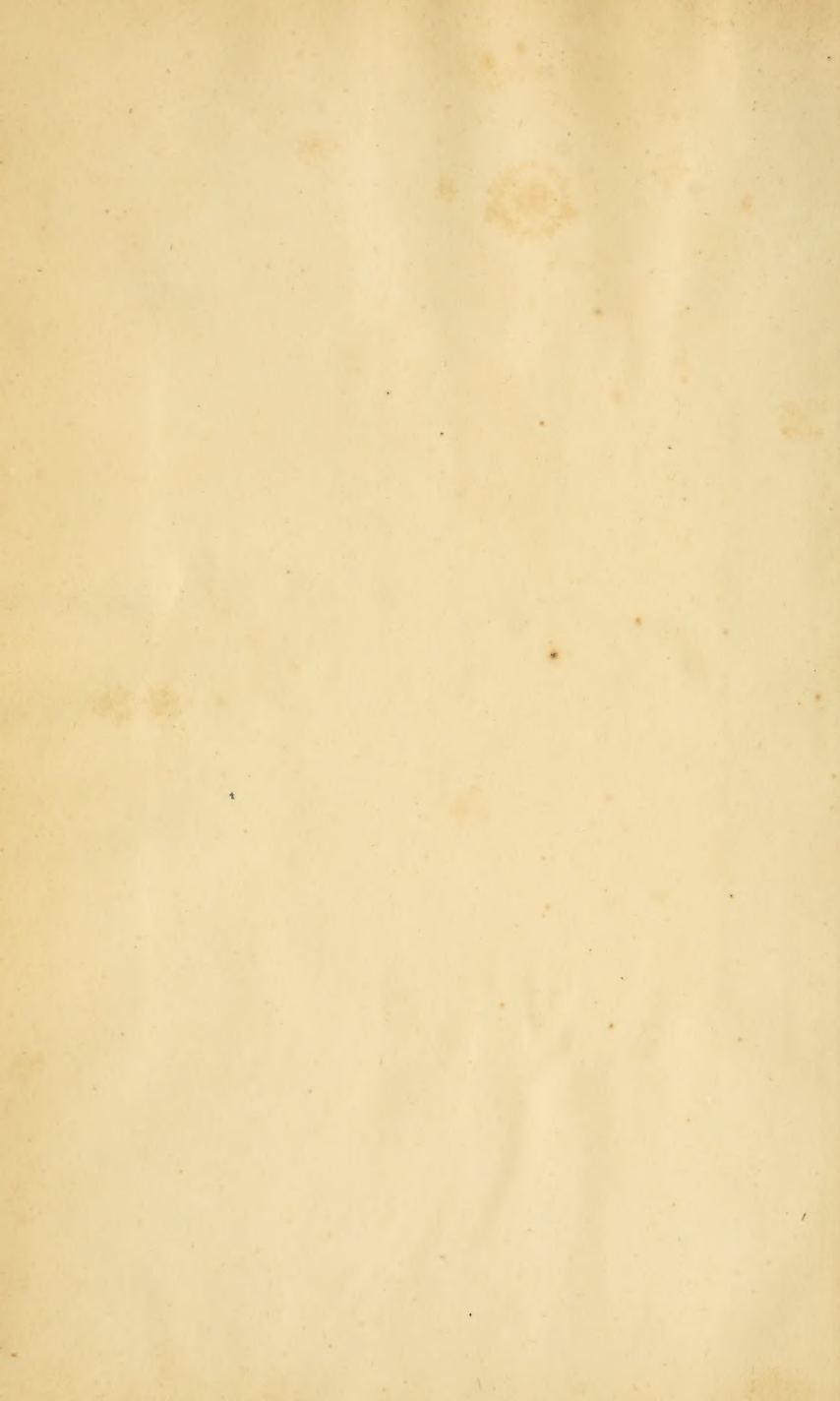
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THE
DISEASES OF THE CHEST
AND
AIR-PASSAGES
OF
THE HORSE.

BEING PART I, VOL. II, OF THE AUTHOR'S "HIPPOPATHOLOGY."

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A NEW EDITION:

THOROUGHLY REVISED, WITH EXTENSIVE ADDITIONS.

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“ — The practice of medicine in regard to these diseases' has experienced a reformation so essentially necessary to meet their altered character, that it is not too much to say, the 'mode of cure' set down for them in works but a few years old is found at the present day, in comparison with the new one, to be not only inapplicable, but positively harmful.”—*Preface.*

PREFACE.

A REPRINT of this section of 'HIPPOPATHOLOGY' has become necessary, not only from the circumstance of the first impression being exhausted, but from the subject being a class of diseases which, in their medical treatment, have undergone changes so remarkable that practitioners hardly suppose they are treating the same complaints. Indeed, the practice of medicine in regard to them has experienced a reformation so essentially necessary to meet their altered character, that it is not too much to say, the "mode of cure" set down for them in works but a few years old is found at the present day, in comparison with the new one, to be not only inapplicable, but positively harmful.

The most glorious improvements of which medicine can boast in our own age are, unquestionably, those which, through its judicious administration, save persons from operations with the terrific knife: surgeons now-a-days being oftentimes able to effect that by simple, safe, and comparatively innocent remedies, which in former days could, in the judgment of their predecessors, be accomplished only by some complex and dangerous procedure. Likewise, in veterinary medicine, horses are now preserved and restored to their owners under the prudential management of the veterinary

surgeon ; when in times past (and even in the present day under empirical and unscientific hands) they were either altogether lost, or left in an unsound state to limp out the remnant of their impaired functional powers. With the best modern veterinary practitioners the phleam is almost laid aside ; and, in my opinion, the day is not very remote when the drawing knife, from the growing practice of abstaining from paring the feet, is likely to undergo a similar dereliction. The principle of “not doing too much” seems fast gaining ground in medical as well as other pursuits.

In this “New Edition” I have got rid, as much as I could, of the *hybrid* nosological character of the original work, by introducing wherever I felt able and warranted so to do, technical names for diseases in lieu of the vulgar cant and farriers’ appellations in common use. I have also made some other important alterations, as well as “extensive additions,” in the present Edition, which I hope will be found, in the hands of the veterinary surgeon, to place it in a yet more favorable light.

THE AUTHOR.

CAVALRY BARRACKS, WINDSOR ;

September, 1853.

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HIPPOPATHOLOGY.

PART I, VOL. II.

INTRODUCTORY OBSERVATIONS.

No general fact appears better established in Hippopathology than the one evidencing that Disease is the penalty Nature has attached to the domestication of the Horse. So long as the colt remains, unbroken, at grass or in straw-yard, notwithstanding he be houseless and shelterless, little apprehension is entertained of any failure in his health. No sooner, however, does the period arrive for his being stabled, than from the day—nay, even from the hour—he becomes so, do we begin to look for his “falling amiss:” an event we are so prepared for in our own mind that, should he happen to escape all ailment during this probationary stage of his life (of which the instances are comparatively very few), we regard him as a fortunate exception to what appears established as a natural consequence of domestication. In translating the animal from his native air to that of the stable—from a situation in which he has been exposed to the “rude blast and pitiless storm” to one wherein the wind of heaven is hardly suffered to visit him, and wherein he is likely to be high fed and little exercised, we have so circumstanced him as to admit of his being put into “condition,” though, soon or late, he is pretty certain to pay the penalty for it. In this situation, after a time, he becomes so far altered

as to be no more like the same rough and ragged animal he was when first taken up than one species of animal is like another: he is, in fact, perfectly metamorphosed. Such a change, however, I repeat, is not brought about without peril. By the means employed to accomplish all this, excited circulation is aroused in his constitution, under the operation of which the probability—nay, all but certainty—is, that some part or other of the complex animal organism will give way. As we render the hardy plant a tender one, although we augment its growth and beauty, by transplanting it from the open air into the greenhouse, so we transmute the cool, sturdy temperament of the animal into a habit of excitability, under which there is great reason to apprehend, from what we should consider slight causes, that it take on febrile or inflammatory action.

The diseases to which a young animal so situated is most of all liable, are those on the consideration of which I am about to enter; and for this liability are they, or ought they to be, paramount to all other classes in engaging the study and observation of the Veterinarian: indeed, not only for this, but for another reason too, which is, that more horses die of these complaints than of any or all others. Should the veterinarian happen to be located in a part of the country where horses are bred, and where they are taken up from their native fields and placed in stables, to be sold or brought into use, he will find himself, among such animals, almost exclusively engaged in treating cases of catarrh, sore throat, strangles, bronchitis, pneumonia, and pleurisy: it being in the fourth and fifth years of their age—sometimes the third—that horses, in general, experience these complaints. It is, therefore, of the utmost consequence that the veterinary surgeon should be well informed on these matters; and it is with the view of communicating such information that I submit to him what will be found in the following pages. At the same time, it is proper for the young practitioner to know, that the conservation of the domesticated young horse will greatly depend upon the discipline and management he is subjected to when once he comes to be

entirely dependent on man for his food, exercise, &c. Particularly will he require care and watching at the seasons of the fall and spring of the year—seasons of vicissitude and prevalence of influenza.

Although it will be my aim, it may and will, in the majority of cases, prove impossible, to preserve the young animal against certain grievances his nature, under domestication, becomes liable to at certain ages and seasons; yet, by judicious management, we may succeed, if not in warding off disease, in rendering its attack comparatively mild and harmless. Disease in one form or another he will, I almost believe *must*, of necessity, have at this period of his life: our object, therefore, should be to conditionate him for the reception of a seizure of the kind, come when it may, so as to render the attack as light as it can be expected to be. For after all is *well* over, not only is the animal no worse (unless it should happen to prove severe, and leave some unfavorable organic changes behind it), but is often the better for it; since it is well known that, not unfrequently, a horse does not thrive or “do well” until he has experienced the so called “distemper.”

Three and four-year-old horses, when brought into stables for the first time, are better kept without corn altogether for the first week or so, and particularly at the seasons of spring and fall. Any soft meat may be allowed them with their hay, such as cold bran-mash, or any other mash, or carrots or turnips or mangel-wurzel; but corn, and especially beans, at this period are of too stimulating a nature for their feed. In the season when it is to be had, nothing is better for them than green-meat: vetches or lucern is excellent feed, and may be given in lieu of hay and mash too, being of itself all that is now required. Our usual practice, when green-meat is not to be obtained, is to give two or three cold bran-mashes a day, with a moderate allowance of hay. In a fortnight's time, a couple of small feeds of corn may be given, conjoined with chaff, one or two mashings making up the three or four feeds a day.¹ Thus

¹ Cavalry horses are, by regulation, allowed four feeds a day.

will the bowels be maintained soluble—a state of them which will indispose the body to feverishness and inflammation. Keep the stable of the young horse well swept and clean; and, above all, cool and free from contaminated or pent-up air. This will be effected by contriving free and open ventilation. But in keeping the stable cool, say from 50° to 55° Fah., let the temperature not descend below this mark, since that would render the stable absolutely *cold*; which, though not prejudicial to the horse like confined heat, particularly when impure as well, is still uncongenial to him, when he comes to be fastened up all day long, motionless, in his habitation. The young horse, coming from a situation where he partook of water *ad libitum*, ought to have water frequently offered him—three times a-day at least; or, what would be better still, *to have water standing by him*. I think most highly of stables and boxes which are fitted up with mangers having water-tanks in them, in which water is always standing ready for use. Exercise, at a walking pace, twice a-day, for half an hour at a time, or double that space of time should the horse not be too weakly for it, and especially should he need it from swelling in the legs from standing, is also required for his health.

A watchful and experienced eye in the superintendence of young horses will much conduce to their welfare, by taking warning in time against any malady that may seem about besetting them. An old remark of a colonel of mine, who took much pleasure in going round the stables containing the young horses, was, whenever he eyed one looking much better in condition—more glossy and sleeker in his coat than the others, and in better spirits—“such a horse will not be long before he comes into the veterinary surgeon’s hands.” The moment any one of them is found to be out of spirits, dull and dejected, hanging his head under the manger, refusing in part or *in toto* his food, coughing occasionally, &c., that moment let the animal be removed from his stable into, if possible, a loose airy box, where mashes will for a time constitute his sole diet, and where water will be placed at his discretion. Should he not have been in the habit of

wearing a cloth, one now will be requisite; and if he has, an additional one, unless the weather be warm, will be advisable. Flannel bandages, likewise, in case his legs be cold, may cover them. Farther than this must be the veterinary surgeon's affair.

In a former volume of Hippopathology, it has been my endeavour to show, that the natural or necessary consequence of transporting a horse from a cold to a warm atmosphere, and from poor to good living, is the generation of *plethora* or fulness of blood, the tendency of which state of body is to inflammation or eruption, called "breaking out:" the seat or site of inflammation or eruption being the part locally predisposed, or that happens to have blood attracted to it by some cause or other of topical or specific irritation; which part, in horseman's phraseology, is said to "fly." The legs, as well on account of their remoteness from the source of circulation as from their dependent position, are, constitutionally, the first to fly: hence the proneness of young horses recently stabled to swelled legs. Exposed sensitive surfaces, such as the lining membrane of the nose, of the windpipe, and of the lungs, and also the delicate tissue of the eyes, are likewise much disposed to fly or take on inflammatory action, not only on account of their exalted degree of innate sensibility and susceptibility, but from the excitement they are especially subjected to in the heated and contaminated atmosphere of the stable. We have only to extend the same train of reasoning to explain upon general principles the production of catarrh, strangles, roaring, glanders, pleuro-pneumonia, grease and farcy, and ophthalmia; which, collectively, may be said to constitute the catalogue of diseases proper to young fresh-stabled horses.

THE ADULT AND WORKING PERIOD of the horse's lifetime is that in which, though seasoned and inured to his new domicile, he is still the occasional subject of disease; but his disorders have now become such as arise either from want or irregularity of exercise, or from excess of work, rather than from heat of stable or stimulating diet. Plethora, it is true, is manifest in his system; but the parts

which in the young animal were too weak to resist its influence, as well as but too prone to yield to local irritation, have, in the adult, gained strength, and no longer “fly” as heretofore. Internal parts and organs, and particularly such as receive much blood, are now more likely to fail than those that are external and remote from the heart. The lungs will still continue very subject to attack, because they especially suffer from over-exertion; but the brain and eyes are liable at this period to fail; the bowels likewise will now experience occasional disorder from the constipations they become subject to, owing to the astringent or cumulative nature of the animal’s food, and, as well as for want of proper exercise, from the disturbances apt to be occasioned in their functions by violent bodily exertion.

THIS ALLOTMENT OF DISEASE between the growing and adult periods of a horse’s lifetime will, of course, be liable to vary with the regimen he is subjected to—*i. e.*, his stable management, the nature and quantity of the work he is made to perform, and other circumstances. The view I have taken of the subject is a *general* one. That the facts stated are worthy of some credit—whether the explanations coupled with them be plausible or not—will appear from the subjoined Table:—

A Table (compiled from Extracts from a “Register of Sick Horses,” limited to a given period) showing the comparative Ages at which Horses appear most disposed to certain organic Diseases.

DISEASE.	No. of patients under 5 years old.	No. in their 5th year.	No. above 5 and under 10.	No. 10 yrs. and upwards, but under 20.	No. 20 years old and upwards.	TOTALS.
Disease of the Lungs . . .	170	50	20	50	10	300
Disease of the Bowels . . .	10	20	40	70	20	160
Disease of the Brain	4	2	5	14	2	27
Disease of the Eyes	30	10	70	35	5	150

From this tabular statement, to the extent that it goes, we learn that pulmonary disorders are more prevalent among horses prior to and during the fifth year of their age, the periods of their growth and domestication, than at any subsequent time; after which age that they become obnoxious to diseases of the bowels, and occasionally of the brain; and that ophthalmia is a disorder especially prevalent at the adult or most vigorous stage of life.

To enable us to pursue this interesting inquiry still further—to show at what particular seasons, and months even, these disorders, respectively, prevail, (though this is a matter necessarily greatly influenced by weather and situation,)—I have, from the same “Register of Sick and Lame Horses,” regularly kept for many years, drawn up the following Table :—

<i>A Table of Cases extracted from the same “Register,” occurring within a given period, showing the particular Months of the Year in which Horses appear most subject to certain Organic Diseases.</i>				
MONTHS.	Disease of the Lungs.	Disease of the Bowels	Disease of the Brain.	Disease of the Eyes.
	CASES.	CASES.	CASES.	CASES.
January	20	12	1	10
February	25	8	—	9
March	23	11	1	7
April	19	10	6	10
May	13	3	3	9
June	14	16	1	13
July	13	13	3	19
August	11	23	3	17
September	11	5	10	19
October	24	3	3	9
November	19	10	3	9
December	16	9	1	4
Totals.....	208	123	35	135

From this synopsis, it appears that pulmonary diseases

prevail most during the autumnal and winter seasons ; that bowel complaints occur oftener in summer than in winter ; and that this latter observation is still more applicable to disorders of the brain and eyes.

THE FORM OF DISEASE is to be considered. With young horses—horses at the critical period of their lives, four and five years old—catarrh and bronchitis, the latter ending at times in broncho-pneumonia or pleuro-pneumonia, or else assuming the membranous type (pleurisy) altogether,—is the usual form in which destructive disease presents itself at this period of life ; and on occasions it is quite surprising in what short a space of time, and how readily, through some fatal mistake perhaps in the treatment, the animal is hurried out of life.

THE COMPARATIVE FATALITY OF DISEASES, which constitutes yet another link that may be usefully appended to this chain of pathological inquiry, is thus sufficiently accounted for. Searching for the deaths in the “ Register,” from which the foregoing tables have been compiled, we find—

Deaths from Pulmonary Disease	77
Deaths from other Diseases (Glanders and Farcy and Accidents excepted)	57

According to this calculation, pulmonary disease carries off more horses than all other maladies besides, setting glanders and farcy out of the computation. It must not, however, be understood that, because more horses die from pulmonary diseases than from all or any other, *ergo*, in reference to the diseases themselves, separately considered, that they are the most fatal : on the contrary, pneumonia (for example) is not of itself so dangerous a disease as enteritis ; for, were horses so obnoxious to one as they are to the other, more would certainly die from the latter than from the former. The predominance of pulmonary disease, among men as well as horses, is to be ascribed to the variableness of the climate we inhabit, and the continual vicissitudes of temperature we are all in consequence necessarily exposed to ; against the effects of which it has been found next to impossible to protect our own bodies, much less those of our horses.

THE PROPORTION OF DEATHS from pulmonary disease may also be estimated from these computations: it appearing in the ratio of 77 to 300, or a fraction more than one in four.¹

TREATMENT OF INTERNAL DISEASE.—The foregoing practical deductions have been submitted with a view of throwing some light on the causes of disease in general, especially of those diseases to which the horse appears most obnoxious: the brief remarks that follow are intended to elucidate their treatment. Reasoning on general physiological principles, one would suppose that, in an animal in whom the pulse in health ranges under 40, the respiration proportionately slow, and in whom the functions of the alimentary canal are so tardily carried on that we cannot insure the operation of a common purge under twenty-four hours, the progress of disease would likewise be slow; so far, however, is this from being the case, that there is no animal, probably, in which acute disease in general makes such fatal havoc in so short a time as in the horse. An attack of pneumonia has been known to kill in less than twenty-four hours: an enteritic paroxysm in half that time. Changes of structure are in like manner rapid in taking place. There is also a prevailing disposition in the constitution of the horse to convert that which was originally soft and cellular in its composition into solid substance; and that which was uniformly solid, but still pliable and elastic in its nature, into osseous substance, no longer flexible nor even impressible. These few preliminary observations will show the absolute necessity there is, in treating the acute diseases of horses, to at once have recourse to—

REMEDIES PROMPT TO ACT AND EFFICACIOUS WHEN THEY DO ACT.—This property it is which has placed bloodletting at the top of our therapeutic catalogue, and at the same time rendered it a measure to which, when requisite, it becomes our duty to have early or at least timely recourse, before symptoms supervene which may forbid it. A surgeon can

¹ The proportion of deaths to recoveries is probably too highly rated here, it being well known that cases of *slight* or incipient pulmonary disorder are very apt to become registered under the head of "Fever."

vomit his patient almost as soon as the emetic is taken ; he can effect purgation in a couple or three hours : the veterinarian can accomplish neither ;—at least, the one not at all, and the other but at a period when his patient (labouring under acute disease) is too far overcome to admit of being recovered. Duly weighing these important distinctions between veterinary and human pathology and therapeutics, it will not be a matter of so much surprise, why in the one case bloodletting has been oftener practised than in the other. Independently, however, of the absolute necessity there seems to exist for venesection in veterinary practice, there still appears another reason why we, oftener than surgeons, have been induced to employ it ; and that is, the consideration, on two accounts, that our patients may not long lie ill : first, because his services are required by his master, and cannot for any length of time be dispensed with ; secondly, because expenses are going on for his keep, &c., although he himself be in a condition to earn nothing. These considerations it is which have induced us to bleed in cases which would recover perhaps quite as surely and as completely without bloodletting ; but not, as it appeared to us, within so short a space of time. However, in the practice of bleeding, in particular for pulmonary disease, in the horse as in man, strange but salutary changes in our practice have within these few years past taken place. Coleman was in the habit of saying, in “inflammation of the lungs,” bloodletting is our *sheet anchor*: at the present day, I would rather say, in young subjects especially, bloodletting, as a *general* measure, must be abstained from altogether. In the form of pneumonic affection often called *Influenza*, to bleed is little less than to kill the patient. Other remedies must be employed.

IN REGARD TO MEDICINE, bearing in mind how requisite it is, in general, that what is exhibited should take speedy and due effect, we ought to take care—at least in all cases attended with danger—to run no risk, in prescribing, as to the event : by which I mean, that in a case wherein we conceive purgation to be highly desirable, it is our duty to insure, by

proper dose and kind and form of medicine administered, the sought-for effect, without running the hazard of creating a necessity for a second dose, considering how long each dose requires to pass through the alimentary canal. Although this remark applies with more force to purgatives than to other medicaments, still it is one that ought not to be lost sight of in the prescribing of any medicine in cases of disease at all urgent. In cases of pressing necessity, there are medicines, such as æther, ammonia, opium, &c., which will speedily, and at once, afford relief, or do so on repetition. Internal remedies are more or less aided by—

EXTERNAL REMEDIES of various denominations; though these turn out of little or no use in acute or painful maladies, unless they exert greater action than, or make an impression superior to, the morbid one which is going on. The insertion of a rowel or seton, in a case where inflammation is raging with a rapidity which, if not checked, in the course of a few hours, must prove fatal, is as futile in practice as piercing the ears of children for ophthalmia, or slitting dogs' ears for congested brain: the counter-irritant must be energetic, promptly and violently operative, to insure the working of any benefit in such cases. We must not forget that there are likewise various bland and soothing means, which, in certain cases and at certain times, prove of the greatest service. They may, some of them, appear but trifling; nevertheless, they have on occasions a most salutary influence.

DECISION IN PRACTICE is a faculty most desirable in any medical man: to the veterinarian it is often absolutely indispensable. A man who has a sick or lame horse desires to be informed by the practitioner he employs to administer to him, not only whether there be any probability of his dying, but, should his recovery appear probable, in what space of time the cure is likely to be effected, in order that he (the owner) may make a calculation in his own mind as to what the cost of keep, &c., is likely to amount during his servant's indisposition. Nay, he is not satisfied even with this information. He must know, further, if the animal be capable of being restored to his pristine condition and powers; and if not com-

pletely, to what degree of approximation. I repeat, to answer all these inquiries with any degree of correctness and confidence, requires a man of experience having penetrative and decisive judgment. Veterinarians have not to administer to the "mind diseased;" they have nothing to do with "placeboes:" their practice is an affair of cause and effect; they must be continually working either good or harm, and without, on the part of their patients (as far at least as their consciousness is concerned), being made acquainted with which they are operating, until the event has made it but too manifest to longer remain a secret.

SECTION VI.

DISEASES OF THE AIR-PASSAGES.

CATARRH, SIMPLE	NASAL GLEET
————— FEBRILE	COUGH
————— CHRONIC	ROARING
LARYNGITIS	BRONCHOCELE
————— CHRONIC	POLYPUS NASI
————— MALIGNANT	EPISTAXIS

The conduits for the transmission of air into and out of the lungs are, the chambers of the nose, the larynx, and the windpipe and its ramifications, the bronchial tubes: altogether, these parts are comprised under the appellation of the *air-passages*. Similar parts, similarly related, constitute the air-passages in man; but between man and horse there is this difference—that the one is able to respire through his mouth as well as his nose, while the other can breathe but through his nose alone: the communication between the cavity of the mouth and the passage to the windpipe being occluded by the soft palate, which in the horse is of extraordinary dimensions. To this fact, familiar as it is, I should say by no means sufficient importance had been attached in the consideration of the pathology of the air-passages. In consequence of the absence of any other outlet and entrance for the air, the nasal passages in the horse are made large and capacious, and from the circumstance of *all* the air respired having to pass through them, these passages necessarily become more under the influence of the aerial current—more obnoxious to any effluvia contained in that current—than the same parts are in man. Hence it is that catarrhal affections in the horse ordinarily have their seat in the chambers of the nose, and not in the mouth, or so often in the throat as well, as in man; hence it is, also, that glanders is (or rather used to be) a common disease in the former, while in man, unless it happen from inoculation, the disorder is unknown.¹

¹ A case has presented itself of late, in which it is said to have had a spontaneous origin.—‘*Veterinarian*,’ vol. xxvi, p. 23.

The same difference of structure and economy will, in a measure, serve to account for the extreme proneness of the horse to pulmonary affections. The nostrils being in him large and expanded for the free admission of air, the membrane lining the nose becomes so much the more exposed and obnoxious to changes of temperature, as well as to noxious effluvia in the air; whence it follows, that inflammation is the more likely to be set up in the nasal membrane, and from that creep into the larynx and windpipe, and settle upon the lungs.

This membrane being so very subject to disease, being the seat of catarrh, of cough, of sore throat, of glanders, of roaring often, and of inflammation in the bronchial tubes, well deserves our particular attention, and (to the extent that we are able to examine it) frequent inspection. On opening either nostril we discover its surface displaying a dotted, shining, humid aspect, of a more or less carnation hue, without any collected mucus upon it, that being one of the earliest indications of disease. It is a part we should never fail to examine in passing a horse in regard to soundness; it is a part which calls for our especial examination in all cases comprehended in the class of "Diseases of the Air-Passages."

CATARRH.

DERIVATION.—*Catarrhus*, from *κατάρρῆω*, *defluo*, I flow down.

SYNONYMY.—A cold, a defluxion, a discharge, or a running at the nose.

DEFINITION.—A sero-mucous defluxion from (commonly) both nostrils; increased redness of the Schneiderian membrane; oozing of tears, and sometimes mucus, from the corners of the eyes; swellings underneath the jaws; snorting; cough; sore throat; with or without febrile disorder.

THE VULGAR AND VAGUE APPELLATION OF "COLD" has, among professional men, very properly given place to the more definite and intelligible one of *catarrh*: there being almost invariably more or less nasal defluxion. Hardly any two persons attach the same meaning to the word *cold*: both

surgeons and veterinary surgeons are apt to be misled by it, so that nothing short of actual inspection of the case can or ought to satisfy the medical adviser. A groom will report to his master that his horse has "only a cold," when the animal is probably labouring under an attack of bronchitis or pneumonia; and will declare a paroxysm of specific ophthalmia to be but "a cold in his eye;" and do this, not from any desire to conceal the truth, but from pure consciousness of the rectitude of his report. Many a life, and still more eyes, have been lost from veterinary aid being deferred or kept aloof after this specious manner.

CAUSES. Such as are called *predisposing* may be said to lurk or arise in horses of from three to five years of age; who have been recently stabled, particularly at certain seasons, spring and autumn, and in such as are very wet or variable. Horses who are pampered, warmly clothed in stables, will be more likely to contract colds than others living, unclothed, in cool or cold stables; and if in the open air altogether they may be said to be hardly susceptible of catarrh at all.

THE EXCITING CAUSES may be said often to be connected with the states and vicissitudes of weather: cold and wet being seasons apt to produce as well as predispose to the disease.

The very appellation of "cold" for this disorder has evidently sprung from the circumstance of its production being commonly connected with exposure to diminished temperature: though cold seems oftener but the *predisposing* cause; the ordinary excitement appearing to be *heat*. It is not usual for horses which are turned out, even though exposed to every inclemency of weather, to take cold; but it is very common after they have been taken up and put into stables, and especially when the stables prove to be warm ones, to be seen falling amiss. It is much oftener the transition from cold to heat than from heat to cold that generates catarrh: in a general way, horses may be taken out of their warm stables and turned into cold situations (provided they are not exposed to wet) without anything like the risk incurred from the reverse treatment. I differ however in opinion with Professor Coleman when he says that horses *never* suffer from exposure

to cold. I have seen several instances of catarrh (not to mention other diseases) consequent upon turning horses out of warm stables into cold and wet pastures and strawyards. Still, the ordinary subjects of catarrh are horses three, four, and five years old, passing from the dealer's or breeder's hands into warm stables; and particularly during wet and cold weather, in spring and autumn. In some years, catarrhal affections become so generally prevalent, and in their attack manifest so much more than ordinary severity, spreading so rapidly among young horses that the disorder not only assumes the character of an *epidemic* or *influenza*, but has the appearance, likewise, of being *contagious*; and though I have never had a satisfactory reason to regard it as such, yet have I ever deemed it prudent to segregate such patients as emitted fluxes, inordinate in quantity or unusual in character, from knowing that every now and then, one among them will turn to glanders. On this point, Dr. Copland observes, "that there is something in the air often producing catarrh, beyond what is perceived by our senses, is shown by the very general or even epidemic prevalence of the affection, during states of the weather and of the air in which nothing peculiar can be observed. Its great frequency, particularly in certain localities and seasons, has induced some authors, among whom Dr. Macculloch is pre-eminent, to impute it to a diluted or generally diffused malaria proceeding from the usual sources of this active agent of disease."¹ In former veterinary works we find catarrh ascribed, above all other causes, to "obstructed perspiration." In old horses, and such as are at their work, no doubt, as a source of expulsion, it is an occasional cause; but the ordinary subjects, I repeat, are young horses—horses that have not yet commenced work, and that are consequently not often, or perhaps have never been, sweated. Horses whose skins have become wet, either from having been sweated or washed, and are afterwards suffered to grow dry without being rubbed, will, particularly in cold weather, be likely to take a rigor or shivering fit. The same observation may be made in regard

¹ 'Dictionary of Practical Medicine,' by J. Copland, M.D., article, 'Catarrh.'

to a horse suffered to stand in any situation where he is exposed to a current of air. But, in most of these cases, heat will be found to have supervened before the disease comes to manifest itself.

FOUR KINDS of catarrh:—*simple*, when void of fever; *febrile*, when attended by fever; *chronic*, when of long and tedious duration; *epidemic* or *influenzal*,¹ when attacking many at one time, and accompanied with remarkable prostration of strength and loss of condition.

THE SYMPTOMS of simple catarrh (which some might call *Coryza*²) are, a watery distillation, accompanied with, or else quickly succeeded by, a defluxion of flakes of mucus from both nostrils—rarely from one alone; some slight humid blush of the Schneiderian membrane; oozing of tears from the corners of the eyes, with globules of mucus observable in them; small, loose, diffuse swellings under the jaw; occasional snorting, perhaps coughing as well, with or without slight soreness of throat: but without depression of spirits or loss of appetite.

FEBRILE CATARRH may be either *slight* or *severe*. When slight, it is nothing more than the simple form, accompanied with some unusual dulness and fastidiousness of appetite, and some little fever, preceded perhaps by shivering: this being the ordinary form in which catarrh presents itself. The severe form is that in which the depression is greater, the appetite nearly or quite lost, the fever comparatively high,—the membranous reddening greater, with turgidity also of the Schneiderian membrane. Its surface will either appear quite dry, or there may be a scanty, yellowish, albuminous fluid, turning afterwards into a thick muco-purulent running, and becoming altogether as abundant as it was at first sparing.

¹ Already described in section 3, vol. i, of Hippopathology.

² Youatt (in his Lecture VI, in the '*Veterinarian*' for 1832) makes a distinction between coryza and catarrh; by one being "inflammation of, and defluxion from, the nasal membrane, or the cells with which it is connected;" the other (catarrh) "the same thing extending to the fauces." Dr. Good has made coryza and catarrh different diseases. Unless coryza be a simple *nasal gleet*, these distinctions will prove puzzling to make in *practice*.

The glands under the throat will swell considerably, and evince tenderness on being felt or compressed; those below the roots of the ears, the parotids, will likewise become tumid, giving rise to what grooms call "the coming down of the kernels." Cough is commonly present, attended with sore throat. In a few cases so extensive and violent is the inflammation in the membranes of the nose and throat, and so abundant the discharges from them, that embarrassment is occasioned in respiration, which may increase to that degree to produce violent and convulsive fits of coughing, and even to put the animal in danger of suffocation unless relieved by the operation of bronchotomy. This, however, is what rarely happens, save in the epidemic variety of catarrh.

THE DURATION of an attack of catarrh is ordinarily from one week to three. Should it not appear to be on the decline about the third week, we may infer that the disease is becoming *chronic*, in which form its duration cannot be said to have any definable limits.

IN CHRONIC CATARRH, the nasal defluxion it is which constitutes the prominent and troublesome symptom: indeed, it is often the only one remaining. Sometimes the matter is yellow, from the admixture of pus with mucus; at others, it is altogether as remarkable for whiteness, and possesses a clotted or grumous character: in a few cases it consists of an opaque, thin, dirty-looking mucus. In general, these chronic cases "run themselves dry," as the phrase goes; though every now and then we meet with one degenerating into *nasal gleet*, an affection I shall consider hereafter.

THE TERMINATION of catarrh, taking its ordinary course, is in the return, more or less gradual, of health. At such times, however, as it manifests more than usual severity, and particularly when much inflammation in the cavities of the nose and throat, and consequent fever are indicated, and there be but little or no discharge from the nose, there is great reason to apprehend the disease running into bronchitis, in which extended and modified form it becomes pregnant with all the dangers of an inflammation in the lungs. Indeed, when a horse is received under treatment for a simple catarrh, and

through proper management recovers so far as to be on the eve of returning—or has actually returned—to his work, and then becomes attacked with bronchitis or pneumonia, it is very apt to go harder with him than had the attack of pneumonia shown itself at the first. Many a horse has changed hands having at the time a simple “cold,” which in his new owner’s possession has run into an attack of bronchitic pneumonia, wherefrom, should he escape with his life, there is still great risk of his becoming a roarer. Catarrh may prove but the precursor of strangles. But again, cases do occur, though happily for us but rarely, wherein the disorder, after having run its course, and cast off all signs of inflammatory action, leaves a discharge from one or both nostrils, to which we give the name of *nasal gleet*; and the appellation is applicable so long as the defluxion presents nothing beyond the catarrhal character: from the moment, however, that it loses this, and especially when it has turned to a thick, turbid, dingy-looking mucus, clinging to the nostrils of the horse, and sticking with gluey tenacity to the fingers of the person inspecting them, we must—should we not have done so before—take care to remove the animal into a stable or box apart from other horses; and at the same time advertise his owner of our suspicions of his ultimately turning out glandered. This, however, is a part of our subject which cannot be properly understood until the diseases, “nasal gleet” and “glanders,” come to be taken into consideration.

PROGNOSIS.—Of itself, a catarrh is a harmless, painless disease, often so mild as hardly to call for medical interference, and never resisting judicious counter-agency for any very long period of time. It is only from its *sequelæ* that adverse results, and occasionally even fatal consequences, are to be apprehended: I mean bronchitis, roaring, nasal gleet, and glanders.

PATHOLOGY.—Observations in this field of veterinary practice are well calculated to throw a light upon one or two extremely interesting and still disputed points, touching the cause and nature of catarrh in general. I have already endeavoured to show, from results of every day occurrences,

that the disease among horses arises oftener from heat than from cold: and yet from the circumstance of that heat acting in combination with miasms generated in situations where horses are congregated, it may be difficult, in many instances, to discriminate between the effects of heat and this insalubrious condition of the atmosphere. In very foul situations, we have not only cases of catarrh occurring, and those of unusual severity, but we meet with cases of glanders and farcy and ophthalmia as well: clearly evincing that at least these latter diseases are attributable to the impurities of the atmosphere, which are at all times rendered more influential by the accompaniments of heat and moisture. We cannot demonstrate that inflammation is present in every case of simple catarrh or defluxion; but when it is, I see no reason for viewing it otherwise than as common phlegmon: though in cases of scarlatina, and some forms of influenza, the appearances the membrane assumes, together with the products from it, are such as to induce a different belief. The seat of catarrh is the Schneiderian membrane, and in particular that portion of it enveloping the *septum nasi*. From this it mostly extends to the part covering the turbinated bones, in which situation it is apt to occasion some degree of stoppage in the nose, arising either from tumid condition of the substance of the membrane, or from the accumulation of augmented secretion. Should it extend, as it usually does, to the fauces and larynx, the consequences will be sore throat. In the wind-pipe and its branches—throughout which the same membrane is continuous—it will give rise to *bronchitis*. The frontal sinuses are likewise in the way of becoming affected, and inflammation in them, no doubt, would occasion headache, manifested by unusual dulness or heaviness: further than which I am afraid we know but little about this form of catarrhal disorder.

THE TREATMENT of catarrh is in general a very simple affair; consisting rather in what the French physicians call *médecine expectante*, than in any very active remedial measures.

FOR A SLIGHT CATARRH, take the horse out of his warm (perhaps foul) stable, or from any cold or wet situation in

which he may happen to be, and turn him loose into a box of the temperature of 55 deg. of Fah., and take care that he have an ample bed, clean and dry, and free from impurities. In cold weather clothe him warmly, and, if required, flannel-bandage his legs. Give him nothing to eat for the first two days but sloppy bran-mashes, and as he probably evinces signs of sore throat, let him have linseed tea or gruel, or chilled water to drink : a pailful of either beverage being hung up within his box, so that he may partake of it at pleasure. Encourage any flux there may be from his nostrils by steaming them twice or thrice a-day either with scalded bran in a hair nose-bag, or by holding the patient's head over a tub or pail containing hay upon which boiling water has been poured; an operation rendered still more effectual by enveloping the head and steaming vessel altogether within a linen cloth or bag open at both ends, which thus becomes a conduit for the steam into the nose. Should he have any cough or soreness of throat, let the throttle be rubbed with this volatile liniment :—

R Liquor Ammoniaë; Ol. Olivæ, āā ℥ij;
 Misce et adde Saponis Mollis, j;
 Ol. Terebinthinaë, ℥ij.
 M. et bene agite.

Should the excrement prove hard and dark-coloured, let an enema of soft soap and tepid water be given, and repeated daily until, through it or a mash diet (without hay) to which for the first day or two the horse should be confined, the excrement becomes pultaceous. The steaming may be practised twice a day, and the liniment may be *once* repeated; but not a second time, lest it cause the hair to come off. In this simple manner, by strict confinement to stable—or rather box, which is preferable—with warm clothing, a slight cold may be in two or three or four days got rid of; but—

IN SEVERE CATARRH, in which there is fever, and perhaps some embarrassment in the breathing, strict abstinence from both hay and corn should, for the first two days, be enjoined;

while an aperient (composed of half an ounce of purging mass, containing 2 drachms of aloes) ought to be given at once, which will gently operate on the bowels. As soon as the dung has become softened, then sparing quantities of hay (but no corn) may be allowed with the mashes. Should the aperient produce actual purgation—which it very rarely does—then let the bran mash, and the water with it, be altogether withdrawn, hay alone being substituted for the one, and gruel for the other, in which way any harm continued purging might do to an irritable bowel will be speedily counteracted. Linseed tea, should it be prepared, will answer the same purpose as gruel, at the same time that it is an emollient and useful drink when the throat feels sore.

If the bowels become greatly relaxed, fever medicine may be administered. This ball, Camphoris, ʒj; Antimon. ʒj; Potassio Tart., ʒiiss; Potassio Nitratis, ʒiij; Thariacæ q. s. m. ft. bol. may be given once or twice a-day. All along, the steaming operations should be steadily persisted in; to which, in cases, from glandular or other swellings requiring it, fomentations and poultices even may be added.

SORENESS OF THROAT, when annoying, is best relieved by either blisters, or mustard plasters, when the repetition of liniment does not answer the purpose. The mustard plaster we generally prefer; because, after taking due effect, which it will commonly do in about twenty minutes, it may be sponged off, so as to be repeated, if requisite, another day. Blisters, become more permanent and troublesome in their operation. For the treatment of sore throat, however, in the predominant and abstract form, it now and then assumes in catarrh, see the account of "Sore Throat." And for the change which must necessarily take place in the treatment whenever the catarrh runs into bronchitis, see the account of the latter disease under the heading of "Diseases of the Lungs."

LARYNGITIS—SORE THROAT.

DERIVATION.—Laryngitis, literally meaning inflammation of the *larynx*, from which, with the addition of *itis*, the compound is formed, is the technical word ordinarily in use for *sore throat*: the word *angina*, though there be states of laryngitis in which the animal is really in danger of strangulation, being applicable to *strangles*. The objection to calling the disorder *laryngitis*, is that such a name would signify the larynx only to be its seat: whereas it is evident enough that the pharynx, and surrounding parts as well, must often, if not commonly, be similarly affected.

SORE THROAT is a common attendant on catarrh; indeed, in some forms and stages of the disease it may often be said to constitute the main or leading symptom. And so long as the throat continues very sore we may be pretty certain that the disease is confined to that part; whereas, should it decline, and the horse still continue ill, we have every reason to believe that the disease has either extended or become transplanted to the bronchial membrane in the lungs.

KINDS.—In this form the disease may be said to be either *acute* or *sub-acute*; but there is a form it now and then assumes which we may recognise as *chronic*, one apt to be of long and troublesome duration.

THE SYMPTOMS of sore throat are manifest to very ordinary observers. The groom knows that his horse has it from his manner of acting with his head with his stiff mode of carrying it. He protrudes his head awkwardly, and if pinched, or but slightly compressed even with the thumb and finger about his throat, instantly coughs, and afterwards throws up his head, so as to avoid if possible a repetition of the pinch. If the soreness be more than slight, or be severe, the animal will manifest difficulty in deglutition, and even cud his food and reject it rather than attempt to swallow it, which act he knows will cause him soreness and pain. On this account he will prefer soft or bruised food: indeed, hard and prickly provender, such as hay, he will frequently refuse altogether.

Sometimes the inflammation and consequent tumefaction of the membrane of the larynx is so great that the glottis becomes diminished to a degree to occasion shortness and difficulty in breathing; should which increase greatly, the opening may, through tumefaction of the membrane and secretion from it, become so contracted and plugged as to give us apprehension the horse, unless relieved, may be suffocated. In such cases, not only is the larynx affected, but the surrounding membranes as well of the fauces and pharynx and their investing tissues; at the same time the guttural pouches and salivary glands participate in the inflammation and swelling; of all which the sequel is not unfrequently abscess of one or both parotids, or it may be of the guttural pouches, or of the submaxillary tissue; the case turning into one of violent strangles.

GLANDERS, even, has been known to follow laryngitis. The membrane of the glottis, from continued or violent inflammation, becomes changed in its character. It becomes infiltrated (dropsical), permanently thickened and indurated, afterwards ulcerated; giving rise to a condition of parts either simulative of glanders, or even to glanders itself.

COUGH, short, hard, dry and frequent, accompanies the disease in its incipient stages; though, as inflammation increases and the sore throat grows severe, the cough becomes faint and less frequent, and under extreme soreness of the throat becomes so suppressed as to be hardly noticed at all.

NASAL DEFLUXION, when the disease assumes this violent or acute form, is scanty or not perceptible at all; though it becomes abundant and frequently most profuse at the height and towards the decline of the inflammatory action. In cases where it exists in profusion it is apt to be coughed up into the mouth, mingled with the saliva.

FEVER will arise at the time the animal is labouring under violent action and annoyance within the throat, augmenting in proportion to the severity of the irritation. The animal will refuse for a time all food, will have great frequency of pulse, and heat of skin and mouth, and will in fact exhibit all the symptoms of high febrile commotion in his system.

CHRONIC LARYNGITIS is a disease which comes oftener under notice than the acute disease. I believe most of the troublesome, enduring, hacking coughs we are constantly consulted about to be attributable to some over-irritable or morbid condition of the larynx: at least, I think I have a right to assign such to be their seat when I find compression of the larynx instantly occasioning the cough, and causing that manifestation of annoyance—shaking of the head, running back, &c.—on the part of the animal, which clearly evinces morbid or abnormal irritability in the part. Another demonstration of the correctness of this opinion is the relief mostly obtained from the application of a blister upon the throat.

THE CAUSES of laryngitis may be sought for among those of catarrh and bronchitis.

THE EFFECTS of this inflammation are various, tending in violent cases, as I have already observed, to suffocation; in others, to that state of parts which is known to produce thick wind or roaring. Suffocation is liable to happen under convulsive efforts to breathe, either during the tumid infiltrated condition of the mucous membrane, or while the passages are loaded with secretion: it is under these circumstances that we are warranted in having recourse to the operation of bronchotomy.

SPASMS OF THE LARYNX are among the distressing symptoms to which laryngitis not unfrequently gives rise. Mr. Haycock,¹ views this symptom as of itself the disease; but this is not the case. It may arise from either inflammation or irritation, going on within, or directly acting on the larynx; or from a distant source of irritation acting upon the organ from an impression conveyed in a reflex manner by one or more of the numerous nerves which terminate within the tissues of the laryngeal apparatus. Mr. Haycock's description of it is a very good one: "Sometimes," he says,² "it manifests itself in a moment, as it were, with a most terrible severity—the animal begins to gasp for breath—the eyeballs protrude and present a wild haggard appearance—the nostrils

¹ 'Elements of Vet. Homœopathy,' &c. By Mr. Haycock, V.S. ² Ibid.

are dilated to their utmost extent, the nose is protruded, and the neck is carried in a line with the back—the flanks heave with most excessive violence, and every time the poor beast inspires air, a sound is emitted which will vary in its character and intensity according to the rigour of the spasm. Sometimes it will be loud and shrill; sometimes a kind of scream; at other times like a loud twang from a trumpet,” &c., At last, the spasm is either suddenly relieved, which is very rarely the case, or he falls very heavily to the ground, struggles for a few moments, and then dies completely asphyxiated.

THE TREATMENT of laryngitis is to be the same as that adopted for catarrh, with this exception, that the throat must be the part to which all local means are to be directed. In mild cases we may be content with fomentation and poultices, succeeded or alternated by giving all the encouragement in our power, through steaming, &c., to discharges from the nose. But in violent and dangerous cases nothing is so effectual as outward stimulation; blisters, and in particular the mustard poultice. In all cases of chronic swelling, with thickening and hardening of parts above the throat, and especially where there is any disposition to become protracted or chronic, nothing tends to bring about a crisis of some sort sooner than a blister.

Purgation would be serviceable could it be managed; but, in these cases, in general, we are debarred from administering medicine by the mouth. When foiled in that, the best plan we can adopt is, by frequent clystering, to keep the bowels at least in a soluble condition.

An attack of spasm could be met at the moment with no other remedy save the operation of tracheotomy. No time must be lost in slitting open the trachea at a convenient place and inserting into the aperture the tracheotomy tube.¹

¹ This tube is described in vol. I of the ‘Hippopathology.’

MALIGNANT OR PUTRID SORE THROAT.

(Laryngitis Maligna.)

My attention was first drawn to this sad and fatal disease, through the '*Veterinarian*,' by Mr. Thomas Proctor, V.S. Solihul, who kindly, in October 1850, sent me an extremely interesting account of it, from which I am about to take the remarks here offered to the notice of my reader:—

CATTLE as well as HORSES are subject to it, and in Mr. Proctor's practice, although "scores of cases" have presented themselves, they have all of them proved fatal.

THE SYMPTOMS differ from those of ordinary or catarrhal sore throat in the disease being sudden in its attack and rapidly running its course; the patient rarely surviving the third day; the entire system from the first sympathising, as is shown by the rapidity (100 per minute) of the pulse; and the general strength of the body failing. At first the salivary glands take to swell and are extremely painful to the touch. Then the throat generally commences swelling, and becomes sore, so much so, as the tumefaction increases, as to make it so painful to swallow that food and liquids too are refused by the animal. At length the throat becomes prodigiously swollen, and difficulty of respiration, with sonorous and distressing breathing, ensues, accompanied with fetor, which, as the complaint advances, turns in some cases so obnoxious that before death it is stinking in the extreme. The membrane of the nose is of a dark crimson colour. The countenance turns doleful and sharp, and even haggard, and with increase of all his anxiety and distress, the poor animal dies a victim to a disease which we appear to have no power even to arrest, much less to cure.

THE APPEARANCES AFTER DEATH are—larynx and pharynx in a state of inflammation, ulcerated perhaps as well, and covered with putrid discharges; root of the tongue ulcerated; considerable enlargement of the salivary glands, and of the surrounding tissues also. Sometimes inflammation and effusion are likewise discoverable at the base of the brain.

THE DISEASE IS CONTAGIOUS: at least the following facts,

which Mr. Proctor received from "good authority," would lead us to believe so :—"Two sturks were found dead in a field, or nearly so, with affections of their throats. The butcher was sent for to dress their carcasses. His own horse partook of some grains mixed with some of the blood taken from the beasts; and in less than twenty-four hours afterwards he died from swelling of the throat, producing suffocation. A sow and nine pigs ate of the blood and grains, and were soon afterwards seized with throat affection, with sonorous breathing, of which all of them died. The others, after much trouble, eventually recovered."¹

TREATMENT.—Fomentations and poultices of an antiseptic nature would be most proper, with tonics and good living. Tracheotomy might become necessary. Isolation and careful management are peremptorily called for.

NASAL GLEET.

NASAL GLEET is the name here given to those discharges from the nose which are commonly preceded by some inflammatory or catarrhal attack of the air-passages, in particular those of the head; though there occur examples of their appearing without any such detectible precursor, originating, indeed, without any visible or apparent cause whatever: in most cases they are apt to continue long after all signs of inflammation have died away. Gleet is more likely to supervene after a chronic than an acute attack of catarrh, and to shew itself in an adult or aged horse rather than in the young subject. Sometimes the discharge comes from one nostril alone, more usually from both. Sometimes the submaxillary glands remain tumefied; sometimes they are not. The Schneiderian membrane, discoloured by inflammatory action, has become pallid and leaden-hued, but is free from all pustular or ulcerative indications. The discharged matters vary

¹ Also the son of the butcher, who assisted his father in the dressing, happening to have a scar on one of his fingers, fell ill afterwards with painful swellings on his hand and face, and was confined for some time from it.—*'Veterinarian,'* vol. xxiii, p. 572.

in quantity and quality in different individuals, and even in the same horse at different stages of the disease. The ordinary gleet consists of a matter more mucous than purulent, remarkable for its whiteness, about the thickness of cream, and in some cases is smooth and uniform, in others clotty or lumpy: in other cases it is yellow, and appears to contain in its composition more pus than mucus. At one time it will collect about the nostrils, and become ejected in flakes or masses, in pretty regular succession; at another, there is a good deal of irregularity in this respect, the running from the nose ceasing altogether for a while, as though the animal were cured, and then returning in double and treble force. Sometimes fetor is an offensive accompaniment of the discharge; at other times no fetor is perceptible. The health does not suffer in the least; on the contrary, it is one of the indications of this disease that the horse eats and drinks and has his spirits, as well as though he were quite free from complaint.

PATHOLOGY.—Formerly, these cases were regarded to be glanders: they were called *chronic glanders*, and many a horse has been destroyed under this false impression. That a case of the kind *might* not turn to glanders is more than I can pretend to say; but that, so long as it continues gleet, it is not glanders, I am fully persuaded; and to show that it is not, I have been in more than one instance successful in bringing the case to a favorable issue.

THE TREATMENT of nasal gleet may be at first simply medicinal: this failing, however, an operation becomes our only resource. A rowel inserted under the jaw is a simple and sometimes efficacious remedy in recent gleet; though it seldom avails much when the disorder has been of any standing. Blisters and setons do no good, unless there be some glandular swelling: then, that may be blistered, though without any great prospect of stopping the discharge, on the irritation of which it probably depends for its existence. Injections of various kinds up the nose or affected nostril are to be employed; though their success must depend upon the duration and nature of the complaint; for if it be of long standing, and

have its seat—as it then probably has—within the sinuses, the injections will do no more than temporary good, and perhaps not that. There are many different kinds of injections : alum, copper, zinc, lead, lunar caustic, &c. At a time when there is much fetor, chloride of lime, in the proportion of an ounce to the pint of water, makes a good injection. What I commonly use, and find to answer very well in general, is the kreasote injection, recommended some years ago by Dr. Elliotson: should that not be found to give satisfactory results, or to require a change, we may try the copper injection :

R Kreasotonis, ℥j ;
Liquor. Potass., ℥ij ;
Aquæ Distillat., Oss.
M. pro injectione.

OR—

R Cupri Sulphatis ; Aluminis, āā ℥jss ;
Aquæ bullient., Oj.
Solve pro injectione.

Either of these injections may be thrown up the nostrils with a four-ounce syringe twice or thrice a-day. I have on several occasions employed fumigation, and various medications in the gaseous form ; but I cannot say I ever have experienced any great deal of benefit from them : in general I have found more efficacy in injections. The medicines which have appeared to have taken most effect, given internally, are preparations of copper and barytes, copaiba, cantharides, and the cubebs and Cayenne peppers. That which exerts the most speedy and decided operation is the balsam of copaiba : like all the others, however, it cannot be implicitly relied on ; in some cases it will in a few days cause the discharge to cease temporarily or permanently, in others no such effect will follow its administration. I give it in ounce doses, rubbing as much linseed meal or oatmeal into an ounce by measure of the balsam as the latter will take up, and making the mixture into one or two balls, and administering this dose morning and evening at first, and, after three or four days, thrice a-day, according to the effects produced. Cantharides may be given, in five-grain doses, to begin with,

twice or thrice a-day ; or it may be advantageously introduced into the copaiba ball. An ordinary gleet ball is this—

R Pulv. Cantharid., gr. iij ;
 Farinæ Lini vel Avenæ, ℥jss ;
 Balsam. Copaib., q. s.
 Ut fiat Bol. bis terve die sumend.

Both cubebs and Cayenne peppers possess stimulant and styptic powers upon the mucous membranes : the former may be exhibited in ounce doses, mingled with copaiba ; the latter in half-ounce doses, with the same, or with common Venice turpentine. Both the sulphate of copper and muriate of barytes have proved useful in these cases : the first stands handed down to us by our professional ancestors as one of the remedies they employed in various disorders in preference to most others ; the other I can speak of from my own experience. Whether either of them possesses any anti-glanderian virtue, will be matter for future inquiry : at present I shall only say I believe that this preparation of copper is one of the most efficacious medicaments we have in regard to some anomalous affections of the air-passages ; and that, as such, it will, on occasions, be our duty to employ it. I believe its operation to be greater in small and divided doses, long continued, than in large doses ; and that it is better, both for the stomach and for its introduction into the system, that it should be exhibited in the form of solution.

CURATIVE TREATMENT.—For cases found to resist such obvious measures as I have been recommending, I have a plan of treatment to advise which in my hands has in two remarkable instances (published in the '*Veterinarian*' for 1846-7, vols. xix and xx), been attended with that success, if not *absolute cure*, which is well worthy of a repetition of trials. Being provided with a small *trephine* or circular saw—the one I have had made for the purpose incises a piece about the size of a sixpence. I operate upon the frontal bone with a view of making an aperture into the frontal sinus, as near as is safe to the medium line of the cranium. The sawing operation must be performed gradually and with moderate pressure upon the saw, since violence might thrust the incised

piece of bone back into the sinus, which on one occasion happened to myself, though no harm resulted from its remaining there: to get it out being impossible. The aperture made, at first clean tepid water may be syringed into the sinus, which, if the passage be unobstructed, will run out at the corresponding nostril mingled with some of the matters discharged. After this the kreasote injection may be tried, and repeated. After a day or two, not only does the flux from the nose become diminished, but effused masses of coagulated blood sometimes make their appearance, which may, in some cases, be extracted with forceps through the aperture. At other times, however, nothing of the sort happens, and the injections are persisted in for several days, perhaps weeks, before any remarkable change takes place. In favorable cases the gleet matter degenerates from a mucopurulent flux into aqueous or serous running, and that after a time but occasional, while the enlarged glands gradually subside. Notwithstanding such favorable change, however, which may or may not be the immediate result of our treatment, we must always, for the first at least, be in expectation of relapses. One morning the nose may seem all but dry, while the next or a few days after, the running will reappear as violently as ever, and the submaxillary gland will at the same time resume its former magnitude. Sometimes, however, after the injections have been used for some days, irritation will, from them, be set up to that degree to itself cause augmented discharge and glandular tumefaction; under which circumstance it will be necessary to discontinue them, at least for a time.

One thing it is very needful to be careful about from the first, and that is, that the hole made by the trephine does not speedily become closed up. I say, "speedily," because, ultimately, and before so very long, close up it will in spite of us. The way in which I oppose Nature's efforts is to fit a wooden plug or a phial cork into the opening. This for a time answers the purpose of counteracting closure, as well as shutting out air and dirt. In one of the two cases I have published, the discharge returning after I had

reason to believe that the animal was restored, I operated on the maxillary bone, below the eye, opening the maxillary sinus, and injecting it. This, however, did no good. To accomplish the cure, which I eventually did, I was compelled to have recourse to trephining in another place, the frontal sinus, for the second time. See the cases in vol. xx of the *Veterinarian*.

THE MODUS CURANDI here appears to be, the destruction of the lining membrane of the sinus, or rather the filling of the cavity perhaps, in the end, with effused matters, which ultimately become, it would appear, a sort of concentrated structure of bone, no longer yielding any discharge, all secretory apparatus being as it would seem annihilated. This, therefore, would appear to be the object of treatment, and the way to effect permanent cure, viz., to destroy all secretory tissue, and fill up the cavity of the sinus.

COUGH.

DEFINITION.—Cough is the sound produced in the throat by a sudden and violent expulsion of air from the lungs.

COUGH DIFFERS FROM ROARING in being the product of expiration alone, and in that expiration being of a convulsive nature: roaring results from impediment in breathing, and is most remarkable in inspiration.

PATHOLOGY.—From the circumstance of cough being present as a symptom in several diseases, and in some without being regarded, of itself, of other consequence than the annoyance it gives rise to, it has become a question among nosologists, whether, even when it appears to exist alone, it can with propriety be viewed as an idiopathic affection. Our observations certainly tend to erecting it, in certain cases, into a disease *sui generis*; although at the same time we are prompt to admit that it occurs much oftener as an attendant of some other malady. We have just seen that it constitutes one of the ordinary symptoms—and on occasions a very troublesome one—of catarrh; we also find it present in strangles, in bronchitis, and in laryngitis: it is also to be met with in pleurisy and in certain stages of pneumonia.

DIVISION.—This view of the subject enables us to make a division of coughs into such as are, *symptomatic* or *sympathetic*, and such as are *idiopathic*.

THE CAUSES OF COUGH have, some of them, been already pointed out: most of them may be said to be comprised in diseases of the air-passages and lungs; but to these are to be added others, which, from not being so demonstrable, have been less noticed. Gibson informs us, that “some young horses are subject to cough and slight fever when they are breeding their teeth, but especially before they cut their tushes:” an observation perfectly consonant with the irritation which I know teething occasions, and one confirmed by my own practice, and particularly when he speaks of the cutting of the tushes having *particular* influence. It is also remarked by some of the old writers, that “worms in the stomach and bowels” give rise to cough: among the moderns, Mr. Blaine is of this way of thinking. Hurtrel d’Arboval includes disorders of the kidneys and bladder among the sympathetical causes of cough. That cough in our own persons, among numerous other producents, may originate in disorder of the digestive organs, in particular of the stomach and liver, is no longer questioned by physicians; and that it may have the same origin in horses, for my own part, I think admits of no doubt.

Observation has long ago made us acquainted with the sympathies existing between the several mucous membranes of the body; and in no case is this stronger or more remarkable than in the instance of the air-passages and alimentary canal; a fact from which we may derive a solution at once of the connection between cough and disordered stomach or bowels, and worms, as also between cough and affections of the kidneys and bladder.

BUT COUGH MAY BE IDIOPATHIC; its seat being either the larynx or windpipe or lungs, and its existence solely dependent on some inflammatory or other morbidly irritative condition of one or more of these parts, and that condition existing by itself, or without connection with any other disease present at the same time.

OUR PROGNOSIS, it will be inferred from what has been stated, in a case of cough, must not be abruptly or incautiously formed. We must endeavour to ascertain its origin and its duration, its nature, symptomatic, sympathetic or idiopathic: we must also pay attention to *the kind of cough*—the particular sound emitted—which in some cases will of itself bespeak its nature. From the bold sonorous cough, characteristic of the sound condition of the air-passages and lungs, we distinguish, by practice, the humid cough; the dry, hard, or short cough; the soft or feeble cough; the hollow cough; the intermittent cough; and the broken-winded cough.

THE HUMID COUGH is that which commonly attends catarrh, strangles, bronchitis and influenza; and in some instances other disorders. It may, however, be idiopathic. It is accompanied with expectoration, which, when abundant, shows itself in defluxion from the nose, and is, in the act of coughing—which is often prolonged, and by mucus collected in the throat, rendered painful and annoying—ejected through the mouth, causing the animal to move his jaws and tongue about, slabbering out part and sucking in the rest of the expectorated matter, and swallowing it. In cases of sore throat and inflammation in the chest this becomes a weak or feeble cough.

THE DRY OR SHORT COUGH—independently of its being a sign of an inflammatory or unsecreting condition of the air-passages—may arise from sympathetic irritation; although I believe it will oftener be found to be idiopathic. Teething may occasion it. Disorder or irritation in the alimentary canal may generate it. How often is it that a young horse having what grooms call “a constitutional cough,” is at the same time looking rough in his coat, and altogether out of health? May not this—which we are in the habit of ascribing to diseased lungs—be owing, in some cases, to disordered or imperfect digestion? I have observed that flat-sided, pigeon-breasted colts are the most frequent subjects of cough, as if malformation of the chest was also occasionally concerned in its production. But, every now

and then, a horse is brought to me with a cough of this description, looking in perfect health and condition, the cough seizing him only while out at exercise, or on his first leaving his stable, or when cold water is given to him. He may have had this cough for weeks or months, or even for years: in the latter case, it troubling him every winter. The cough may have originated in catarrh, or some inflammatory attack of the air-passages or lungs, or it may not be traceable to any such cause: it may be idiopathic from beginning to end, or it may become idiopathic after being for a time sympathetic. The probable seat of this cough is the larynx; I believe it to be often confined to the rima-glottidis. Any tumour pressing on this part might occasion it. In the absence of this, it is probably owing to congestion or thickening or other alteration of the membrane, and consequent morbid irritability of it. D'Arboval describes the cough of pulmonary consumption as small, *short*, feeble, and accompanied with a sort of wheezing.

THE HOLLOW COUGH.—A deep sepulchral sort of sound, something of a compound between a cough and a groan, emitted, according to the sensation the sound conveys, from the very inmost recesses of the air-passages. So peculiar is the sound of this cough, that, being once heard, it is not likely to be forgotten. Its seat, I believe to be the wind-pipe, or some of the larger bronchi. I have known several horses having it without its affecting their health at all. There was one lately in our regiment who regularly did his duty, and seemed no otherwise inconvenienced by it than at the time it was on him. In general it exists but at particular seasons.

INTERMITTENT COUGH is the name given to those fits of coughing with which horses are in the habit of being seized on a sudden, and oftener at work than during repose. The cough is a dry, hacking, half-suppressed one, is repeated several times in quick succession, and does not return again for some considerable interval. It is a cough that may endure a very long time. Delafond says it proceeds from pulmonary emphysema.

THE BROKEN-WINDED COUGH is the one emitted in the disorder we call "broken-wind." It is of itself so completely characteristic of that disease that we require no other test ; and withal it is quite distinct in its sound from all other coughs. I defer all description of it until the subject of broken wind shall come under notice.

TENDENCY OF COUGH. — There being several diseases which are on occasions ushered in by cough, it is difficult to say, in the first instance, when a horse is brought to us with recent cough, to what it may owe its origin, or, symptomatically, be leading. It may be but the forerunner of simple catarrh ; it may usher in laryngitis, bronchitis, pleurisy, pneumonia, &c. On the other hand, it may continue without the manifestation of any other disease, as a simple cough, only of present consequence inasmuch as it proves troublesome and annoying, especially during work. In allowing this cough to run on, however, and particularly in suffering the animal to work with it, we run a risk of spreading the irritation already existing in the air-passages, and at the same time producing febrile disorder in the system. Should this not follow, we shall in all probability, by neglecting the cough, have it become "settled," or "established," or "chronic," and in that form more difficult than ever to remove ; or, when removed, extremely likely to recur, and especially in the winter season. What may result from the continued irritation of chronic cough—one which is sometimes better, sometimes worse, or that disappears in summer and returns in winter—it is impossible to say : much will depend on the condition, sound or unsound, of the animal's lungs ; a horse in whom those viscera continue healthy may have a cough for years, and never experience any ill effects from it ; in another, with unsound lungs, it may lay the foundation for thick or short wind, or for pulmonary consumption. There is a notion abroad that a short cough is likely to "end in broken wind." I cannot, however, altogether subscribe to this prognosis.

THE TREATMENT OF COUGH must be directed to the fountain-head of the malady, to the seat of disease or irrita-

tion to the existence of which the presence or continuance of the cough is owing. A cough, an accompaniment of catarrh, will only vary the treatment recommended for that disease, in inducing us to stimulate or soothe the throat, when probably without it we might not have deemed that necessary. The cough resulting from disease of the lungs, commonly slight and feeble, will require no especial attention; unless it should continue after the subsidence or disappearance of the pulmonary disorder, which it but rarely will be found to do. The cough often attendant on dentition will be treated with most effect by a soft diet, a gentle aperient, and the lancing of the gums over such of the tusks as are about making their way through. Suspected disorder in the alimentary canal or liver must be corrected before the cough—should it be supposed to be connected with such disorder—can be removed. Should worms be present, the case will require vermifuge medicine.

IDIOPATHIC COUGH WILL REQUIRE more special treatment. When recent, and there be signs of concomitant febrile action, such as increase of pulse, heat of mouth, dulness, &c. depletive and soothing means are indicated: aperient febrifuge medicine, mash diet, and so forth. The febrifuge ball may be given daily, until some slight impression is made on the bowels; actual purgation being not only unnecessary, but harmful. The animal should be forced—starved from water—to take demulcents for drink; and the best way to accomplish this is to hang up a pailful of clear, thin, well-made water-gruel, or linseed-tea, which is better still, in his box; supplying him from time to time with fresh, whether that be consumed or not, but not showing him any water. These soothing remedies are very likely to convert the cough into a case of catarrh, should that not be the natural tendency of the former; and this auspicious change will be still more likely to be induced by fomentations to the throat and steaming the nostrils. A stimulating application rubbed upon the throat after the fomentation will prove beneficial. For this purpose we may use the liniment composed of equal parts of liquor of ammonia and olive oil; or we may employ

the turpentine liniment which is recommended for sore throat in my account of catarrh, at p. 21. Should more counter-irritation still, be required, the throat may be painted with the Acetum Cantharidum, or a regular blister may be employed. For my own part, however, I prefer a sweating blister to these liniments: there is no occasion to remove the hair, and care should be taken not to rub in above a table-spoonful of the liniment of cantharides, lest it cause the skin to peel off.

IN COUGH UNATTENDED BY FEBRILE EXCITEMENT, and which, as far as can be ascertained, of itself constitutes the sole ailment, one of the following balls, from either recipe, may be exhibited morning and evening:—

R Camphoræ, ʒij;	R Extract. Belladonnæ, ʒss;
Pulv. Scillæ, ʒj;	Farinæ, ʒss;
Pulv. Opii, ʒj;	Iperiacæ, q. s.
Glycorrhyi, ʒij. M. ft. Bol.	M. ft. Bol.

Bruise the camphor with a table-spoonful of spirits of wine; then add the remaining powders, and make them all into a ball with honey or treacle.

Before quitting this part of my subject, I would observe, that repose is absolutely necessary for the cure of cough: so long as the horse continues to be taken out, and especially in damp cold weather, so long shall we in vain administer to his cough. Loose in a box, he needs no exercise; on the contrary, he should be kept quiet, and be warmly clad, with even his legs bandaged with flannel, should the weather at the time prove cold.

DIET.—Change of food often proves of service to a horse having cough. In summer, green-meat may be substituted for hay, and no corn allowed the while. In winter, in lieu of corn, carrots or turnips, mangel-worzel, potatoes, or parsnips, may be given, properly cut, *i. e.* sliced.

IN CHRONIC COUGH—cough that has been neglected and that has from its duration, or habit of relapse, resisted such treatment as above recommended—I have often experienced benefit from the insertion of a seton in the throttle; a practice I often prefer in this case to a rowel under the

jaw. And when there is the least suspicion that the cough is kept up through any source of irritation within the thorax, a rowel may be insinuated in the breast; for with this counter-irritation I have known medicine to succeed, when, without such collateral aid, it has failed. The medicine best adapted for a case of this latter description is, after clearing out the bowels and setting the digestive organs to rights, the camphor and squill ball I have just prescribed; or, that failing, the belladonna ball may be tried. When both fail, a course of mercury may be recommended. Keeping the horse quiet in his stable is indispensable.

ROARING.

ROARING is no more a disease in horses than crying is in ourselves. It is but a symptom, and of itself so vague a one, that, without much careful investigation, it is often as difficult to say what disease or disorder is giving rise to it as to divine the cause of a person's grief.

DEFINITION.—Roaring may be defined to be, breathing with a loud and unnatural sound, under exertion of any kind.

THE SOUND or noise emitted varies under different unnatural conditions of the air-passages, and also under different degrees of exertion to which the animal may be put. With a view of elucidating the first of these assertions, I shall relate an experiment I made some years ago, touching the constriction of the windpipe. The second assertion rests upon facts known, I believe, to most experienced horse-men; viz. that roarers made to gallop very fast become whistlers: and, pushed to their utmost speed, lose even their whistling noise. These varieties in the sound or "roar," have given rise among horse-people to the epithets, "grunters," "wheezers," "whistlers," "high-blowers," "trumpeters," &c. The experiment I made is this:

I passed a ligature of broad tape around the windpipe at about one-third of its length down the neck from the head. The tape was at first drawn only moderately tight, and the animal roared when made to trot. Next, the pipe was compressed to about half its natural caliber: the animal then

whistled. In both states the sounds emitted were found *loudest in inspiration*. At last, I drew the ligature as tight as I was able to do. In a minute afterwards, the animal, after staggering a good deal, fell down, struggled violently, and, suddenly throwing himself upon his side, expired in two minutes after he had fallen. I found the membrane lining the windpipe reddened, and covered with frothy mucus. The ligature had *not* completely obliterated the canal: I could still pass a crow-quill through the constricted part of it.

From this experiment we learn—that a certain diminution of the caliber of the air-tube produces roaring; that further diminution or contraction of its area causes whistling; and that a degree of constriction beyond this occasions signs of suffocation, which, if not relieved, end in the extinction of vitality. A whistler, therefore, I should call an intense roarer; a wheezer, I should say, is something short of an actual roarer. Be it remembered, however, that, although we are attempting such nominal distinctions, in a pathological view they must all come under one general heading, which, by common consent, at present, we denote by the appellation of “roaring.”

WHAT IS THE CAUSE OF THE SOUND? The experiment just detailed shows, as far as it goes, that the roaring is to be ascribed to diminished area of the passage for the air to and from the lungs; and, in truth, this will be found to be the essence of the etiology of roaring. We appear to know little or nothing about roaring being liable to result from other altered condition—say, an unusually *dry* one from want of secretion, or from ulceration in the passage; though, to say the least about them, there seems to be room for supposing these to be causes. Deprivation of elasticity or pliability—as where parts become ossified—likewise have the effect of occasioning roaring. The various collected reports that have been made from time to time on the states of the air-passages of roarers, have shown that all of them have produced the effect in one of three ways, viz. either by contraction of the passage or its orifice; by distortion or

deformity, or want of elasticity in it; or by actual obstruction within it: and this difference of causation, together with the part or place in which it exists, will serve still further to account for the various *kinds* of—or rather sounds emitted in—roaring.

THE KIND OR NATURE OF THE SOUND, therefore, will be found to be referable—first, to the nature of the impediment or obstruction; secondly, to the degree or extent to which it exists; thirdly, to the situation of it. To illustrate this by example, we may expect a different sound from thickening of the membrane, or *general* diminished caliber of the passage, from what either ulceration, or ossification, or *partial* diminution or impediment, would produce; this sound will vary again, according to the degree of thickening, or contraction, or ulceration, or ossification; and, thirdly, it will undergo modification, according to the part whose lining membrane is thickened, or ulcerated, or ossified: according, in fact, as its seat happens to be the nasal chambers, the larynx, the windpipe, or the bronchial tubes. I do not mean to assert that all this can be realised in practice. Unfortunately for us, I am afraid we shall find our art not sufficiently advanced to connect the sound, in most cases, with the seat and nature of the cause; but I mean to contend, that, if we would set about the investigation as men of science, all these considerations must of necessity enter into our theorification.

UNDER WHAT CIRCUMSTANCES IS THE SOUND EMITTED?—When any sudden effort or exertion is made, or any hard or fast work performed—whenever, in fact, the breathing is so disturbed that the current of air through the windpipe is rendered rapid and voluminous. So long as the air passes in a slow and uniform stream through the pipe, as in ordinary breathing, no noise is heard, nor is any inconvenience felt by the animal; but the moment any rush of air is made, the contraction or impediment, whatever it be, opposing this augmentation of speed and volume, roaring is produced by the vibration of the air against the obstructing body. So long as a horse continues at rest, or goes but at a foot's

pace, or even but trots, although he be a roarer, no roaring, probably, is heard—no person would discover his imperfection: gallop him, however, and particularly up hill, and press him hard, and, as the dealers say, “you may hear him in the next parish.” Heavy draft in harness, and that too up hill, is probably the severest trial you can put the roarer to. In general, any sudden act of exertion, such as a leap or jump, or gambol of any sort will produce it. Even fright, or sudden alarm of any kind, will elicit the noise. In fine, whatever induces a sudden and vehement sigh will be apt to make the roarer disclose his imperfection.

IS IT A SOUND OF INSPIRATION OR EXPIRATION, OR OF BOTH?—Ordinarily, it is only in inspiration that the sound is heard. Under circumstances of great distress, however, as when a horse is galloped to bursting, and especially should it happen that he be one of the worst class of roarers, the sound is audible enough in expiration as well as inspiration.

THE TESTS OF ROARING suggest themselves from a knowledge of the fact, that a horse must be made to breathe with a sudden effort, or else experience a degree of labour and difficulty in drawing his breath, before the sound can be elicited. For the purpose of producing this sudden respiratory effort, our common practice is to make a feint or threat to strike the animal; which indeed rarely fails (should he have the disorder) to call forth, involuntarily, the roar or characteristic grunt, and so confirm our worst suspicions. Should the animal not be a roarer, the alarm we create occasions no sound whatever in the breath. Next, we cough the horse: the protracted grunting or groaning of the cough being to an experienced ear equally characteristic, may, in conjunction with the former test, be received as pretty satisfactory. I regret, however, to be compelled to add, that the absence of these summary tests will not, *in all cases*, bear us out in pronouncing the horse *not* to be a roarer. In a case of this kind, my common observation to the gentleman whose horse I may be examining, is, “I do not find your horse roars either on being struck or coughed; but you must not take this remark as a certificate that he is ‘perfectly sound’ in

his wind. In order to satisfy yourself of that, you had better give him a 'splitting gallop,' and, if practicable, on soft ground or up hill: this is your only *sure* mode of detecting minor imperfections in wind." I have heard Mr. Sewell, the late Professor, say, "that the best trial we can subject draft-horses, suspected roarers, to, is to put them in harness, and compel them to drag heavy loads:" and I quite agree with him; it being in laborious draft in particular that the respiratory powers are called into play.

TO CONCEAL IMPERFECTIONS IN THE WIND, a knavish horsedealer will, when he is showing you a roarer, take especial care that the horse both leaves and approaches you at a moderate pace, and does not strike into the gallop until he be removed to too great a distance for you to hear the roar. He will likewise, when dismounted, intimidate you, if he can, from approaching the animal: in fact, he will practise every device rather than suffer you to put the horse fairly to any reliable test.

DOES ROARING CONSTITUTE UNSOUNDNESS?—This is a point on which the same judge (Lord Ellenborough) has delivered two opinions; the latter upsetting the former one, and establishing roaring, for the time to come, as *unsoundness*. The first opinion was given in 1810. His lordship then said, "It has been held by very high authority, that roaring is not necessarily unsoundness, and I entirely concur in that opinion." In 1817, his lordship pronounced, in reference to a similar case, that, "if a horse be affected by any malady which renders him less serviceable for a permanency, I have no doubt that it is unsoundness. I do not go by the noise but by the disorder." And from that time to the present, roaring has been admitted, in court, to call for a verdict of unsoundness.

M. Huzard, jun., a French veterinarian, has penned the following sensible observations on this question:—"If roaring were an accompaniment of ordinary respiration, the evil would be discoverable at the time of purchase: but, in consequence of its requiring exertion to elicit it, the purchaser who does not put the animal to that test cannot become

conscious of its existence. In every instance, roaring detracts from the speed and duration of the animal's paces, and consequently depreciates him. Sometimes it renders the horse incapable of performing any (fast?) work at all. A horse is most unquestionably returnable for it, *alias* unsound."

ROARERS, THOUGH UNSOUND, STILL SERVICEABLE.—We are not to imagine, that, because a horse is a roarer, he is altogether useless. There are numerous instances of roarers doing harness work very well, and some of their doing their duty even as hunters with little annoyance to their riders or distress to themselves. Indeed, to repeat what I said before, and I have heard the remark more than once from those who have hunted roarers, "the faster they go the less noise they make." A great deal, however, will depend on their condition. When that is hard and good, it is quite surprising what a difference it makes in their noise. Roarers are most of all objectionable as *fast* harness-horses. Coach-proprietors are so fully impressed with their incapacities for the purposes they require—quick and laborious draft—that, in a general way, they refuse to purchase them at any price. The following reminiscences from Nimrod are at once so characteristic and rich in truth and humour, that I cannot forbear inserting them here. "I never purchased but two roarers, and they cured me of going to that market again. One nearly broke my neck at a fence, having entirely lost all his powers in the space of five fields; the other I christened 'the Bull,' for he could have been heard half-a-mile off if he got into deep ground. Notwithstanding this, I have seen two brilliant hunters that were roarers."

MARES SELDOM BECOME ROARERS, at least, in comparison with horses. This is a fact, I believe, too notorious among men of horse experience to admit of doubt; though it is one for which it appears difficult, if not impossible, to assign any satisfactory reason. However, as I am informed, so stands the fact.

ROARING IN MAN.—Of this, one instance only has come to my knowledge. I was out shooting one day with two friends, one of whom was quite a lad; when, as I was

walking by the side of the other up a hill, I suddenly heard a whistling behind me, occasioning me instantly to spring round with alarm, thinking there was a roaring or rather a whistling horse galloping close at my heels. My fright subsided, but surprise and curiosity took its place, at finding it was my young friend who was making all this noise in his efforts in climbing the hill. On laughing and telling him he was "a regular whistler," he informed me, he had, not long before, been the subject of a severe bronchitis, which had left this unpleasant impediment in his breath.

PATHOLOGY OF ROARING.—This includes the investigation of the morbid and other phenomena on which the existence of roaring depends: it is a part of our subject replete with interest, seeing that it is upon this knowledge that all our hopes and expectations of remedy must be erected. Unless we can arrive at a thorough insight into the cause of the evil we shall deceive both ourselves and our employers in attempts to remove it. To hear people talk about *the seat* and *the cause* of roaring, one would suppose that both might be included between the finger and thumb, and that it was either too mysterious ever to be developed, or was universally in one place. Such unscientific and narrow views as these it is that have led people to talk about the *cure* of roaring, as if some remedy were in existence at once to remove the evil. Such discourse may impose upon our employers; but, surely, among ourselves, if we aspire to be thought men of science, it must be nonsense in the extreme. Unless what I am going to relate be untrue, it must be evident enough, even to unprofessional minds, that the causes of roaring are many and various, and that, consequently, the remedies cannot but be something like proportionate in number, and oftentimes extremely dissimilar.

ROARING IS NOT A DISEASE, BUT A CONSEQUENCE OF DISEASE—of catarrh, strangles, influenza, laryngitis, bronchitis: to which Hurtrel d'Arboval has added, pleurisy and peripneumonia; when, I may remark, bronchitis is, as it generally is, a concomitant of those diseases. Now, let it be observed, that these are all inflammatory diseases of the mu-

cous membrane lining the air-passages, and that the ordinary consequence of their virulence or long continuance is—

THICKENING OF THE MEMBRANE, with occasional ulceration of it; and this it is that appears to constitute, in *young* horses, the ordinary cause of roaring. How many three and four-year-old horses are there passing from the dealer's or breeder's hands into stables, who, soon after their arrival therein,—particularly if it should be in the spring or autumnal season,—breed strangles or distemper, or else contract cold and sore throat, any of which disorders, in a severe form, settling upon the throat and windpipe, will be very apt to lay the foundation for roaring, by leaving behind them a thickened, perhaps an ulcerated condition of membrane, and most likely at the part where it lines the glottis; though the same may take place within the cavity of the windpipe. There is likewise reason to believe that similar alterations of structure, even within the branches of the windpipe—the *bronchial* tubes—may have the same effect in kind, if not in degree. In the course of time, the thickened membrane is found to undergo still further changes: from being simply thickened, it turns opaque and white, and acquires a leathery, indurated feel and texture—organic transformations which set all and every kind of treatment completely at defiance.

ULCERATION OF THE MEMBRANE OF THE LARYNX, particularly of that part lining the glottis, is very apt to follow an epidemic, or specific, or malignant inflammation of this membrane; and this ulceration will often assume a sort of chronic inactive form, in which state I have had reason to believe it has continued for years, or even to the end of the animal's life. This it is that has given rise to roaring being said to be present in glanders. Such a case of roaring, it is obvious, would require a treatment altogether different from most others.

METASTASIS.—Any inflammation about the throat or its vicinity, by extending to or settling upon the larynx or windpipe, may in the end be productive of roaring. In illustration of this, I quote the following:—

The late Mr. Coward, V.S., Royal Artillery, had, in a

horse of his own, the simple operation of bleeding succeeded by extensive tumefaction and suppuration of the jugular vein; and this was followed by abscess of the parotid gland, disease of the larynx, and permanent roaring.

BANDS OF COAGULABLE LYMPH effused into and running across the cavity of the windpipe constitute another source of roaring; but, I believe, a very rare one. The inflammation is the same, and its disposition the same, as in the former case; only instead of the lymph being effused into the interstices of the membrane, and thickening its substance (*interstitial deposit*, as it is called), it is poured forth upon its surface, where it assumes any form chance or circumstances may happen to give it, and, in the end, becomes organized, and part of the pipe itself, or rather of its membrane.

In the veterinary museum formerly belonging to my father is a preparation in which the muscle has been displaced by the formation of a cross-band of coagulable lymph between it and the posterior part of the tube, by which the interspace is divided into two passages, one large enough to admit a walnut, the other a hazel-nut. The horse it was taken from breathed with labour and exertion, and, even when but moderately exercised, roared aloud.

OSSIFICATION OF THE LARYNX, by which is meant the entire or partial conversion of its substance into bone, a change peculiar to aged horses, may exist either as a cause or a concomitant of roaring. The parts commonly found thus converted are the *thyroïd* cartilages; though the others, at a later date, may participate in the change. It seems to be the result of some chronic inflammatory action excited in the cartilages; and this I ascribe to the injurious constraint to which the larynx is so repeatedly subjected, and not to any of the causes which give rise to it in the membrane. We occasionally meet with partial, but rarely with entire, osseous conversion of the rings of the windpipe; nor do we often see bony accretion of them one to another. In the case of the larynx, whether the ossification be partial or complete, the part must suffer more or less inconvenience from loss of its accustomed elasticity and flexibility.

DISTORTION OF THE LARYNX AND WINDPIPE, there is every reason for believing, is a fruitful source of this vexatious disorder. Dissection is every day adding to the instances of it; and when we come to meditate upon the notorious fact that—

HARNESS-HORSES CONSTITUTE A LARGE CLASS OF ROARERS, —we shall probably regard these views as well founded. When we look around us, as we pass along through the streets of London, and count the numbers of fine high-spirited horses there are in carriages, waiting for hours and hours together for their masters and mistresses, and all the while reined up with their necks crooked in a form unnatural, and constrained, and painful even to behold, much more to be borne—as is sufficiently manifest to any one from the continual jerks up and down of the suffering animals' heads; and when we come to consider the constriction—nay, compression—that must all this while be exerted on the larynx, together with the constrained bend that must in most cases take place in the upper portion of the windpipe, can we wonder at these parts undergoing distortion? At first, it is true, the distortion is but a temporary grievance, the intervals of relaxation affording the parts, by nature highly elastic, opportunity of recovering their shape and tone to a great extent. Repeated and long-continued acts, however, of such violence, gradually enfeeble the elastic powers of the cartilages and their ligaments, and the result ultimately is, permanent deformity or distortion of the larynx or windpipe, or of both together.

THE TIGHT REINING-IN OF THE HEADS of young horses for any length of time together, and particularly of subjects whose necks have not, by regular gradations of tightness of the reins, been brought to bear the constraint with comparative impunity, is a practice at all times highly censurable, and one that has too often, in times past, given us reason to date the origin of roaring from the breaking of a colt, or his first lessons in the menage. Such harsh treatment, however, is now, in all well-conducted riding-schools, pretty well abolished; added to which, the bearing-

rein in harness is nothing like so generally in use, or applied with the severity it used to be in former days ; all which leave much less ground for apprehension on this score. Unless it be in the case of a colt whose head is so unmeetly set on, or whose neck is so straight, so short and so thick, that, without a force and constraint likely to be productive of injury, there is no possibility of getting the animal's head into its "proper place."

Mr. W. H. Goodwin, late veterinary surgeon to the Queen, informed me that, during his professional residence at St. Petersburg, his attention was especially drawn to several horses who, by himself and others, had previously been declared to be roarers, in consequence of their having got rid of their complaints in the menage. These horses, it would appear, roared in consequence of distortion produced by former unnatural flexure of the windpipe ; and this distortion, the Russian system of equitation—which consisted in the elevation of the head and projection of the nose—was admirably adapted to counteract, and, in process of time, remove.

WASTING OF THE MUSCLES OF THE LARYNX.—Some years have now elapsed since it was first discovered that the larynges of roarers occasionally presented the singular phenomenon of the muscles on one side being wasted away or absorbed, while, on the other, they appeared to exhibit a normal volume and redness, and strength of fibre. Since the discovery was made, every one almost has met with cases of the kind ; though no person seems as yet to have given an explanation of this new piece of pathology. My view of the case is this :—

Horses in general, as every man in the habit of riding and driving knows, have what is called "a hard and a soft side" to their mouths : and there is no situation in which they are more likely to contract this, should they not possess it before, than in harness ; for the animal is no sooner borne or reined up, than, in order to give himself as much ease as this constrained position admits of, he inclines his head to one side, and in that posture carries it, all the while bearing with the hard side of his mouth against the bridoon, and thereon

reposing, for ease, almost the entire weight of his head. The effect of this on the larynx is, that while one side is compressed, and cannot act, the other is left, comparatively, at liberty; or, at least, so far unconstrained, that by some extra exertion, the muscles on that side are enabled to perform their functions, while on the former no action can take place at all.

I had long framed this theory in my mind, when one day perusing Mr. Youatt's Lectures in the *Veterinarian*, I was not a little gratified to observe that my friend had been entertaining ~~some~~ such notions as my own, although he had not gone the same length in his explanation. His words are—"In the far greater number of cases there is distortion, rendering the muscles on one side useless, and, therefore, causing them to waste away. . . . The wasting of the muscles, therefore, is the *effect*, and not the cause, of that which produces roaring."

Now that fashion bids us to leave our bearing-reins at home—and a very good fashion, when horses have been properly bitted, this is—we shall find, probably, some diminution in the number of harness-horses that become roarers.

THE LATE MR. J. FIELD has narrated THREE CASES of the dissection of roarers:—In the first case "the crico-arytenoideus muscle and two others on the left side were so pallid that he felt quite satisfied of the cause." In the second, "musculus arytenoideus sinister completely wasted." In the third (a bad roarer), "all the muscles belonging to the left side of the laryngeal cartilages wasted and pallid."

QUERY.—Are the muscles on the *left* side more subject to atrophy than those on the right? and if so, Why?

DEFORMITY OF THE LARYNX OR WINDPIPE, by which I mean original malformation of them, is included by the French veterinarians among the causes of roaring. I do not remember ever having met with a case of the kind; though I once saw a preparation which gave me great reason for believing that the canal of the windpipe might be mis-shapen even from birth.

It was a wet preparation. The tube of the windpipe,

instead of being circular, was triangular, the sharp angle being turned forwards. Behind, the flaps of the rings of the pipe overlapped one another much beyond what was natural. The lining membrane was thickened throughout its extent.

MECHANICAL OBSTRUCTION proves an occasional cause of roaring. A tumour of any sort, or any foreign body pressing against the air-tubes, or forming within their cavities, may, either of them, be productive of roaring.

THE HEAD MAY BE THE SEAT OF ROARING.—My old friend and school-fellow, Mr. James Turner, in 1837, sent a paper to the *Veterinarian*, the product of very accurate observation of a decided case of roaring in a horse sent to his Infirmary to be destroyed on account of lameness. His account is—

Having completely satisfied himself of the existence of the disorder—the noise elicited being “precisely that of a common roarer,”—and in one of its most aggravated forms,—he very carefully examined the larynx, trachea, and lungs after death, without arriving at the cause, which at length was discovered to be in the head. “The right anterior and posterior turbinated bones were enormously enlarged,”—“dilated,”—“not distended by any accumulated contents. . . . Upon attempting to pass my finger,” continues Mr. Turner, “down the passage, through the palatine arch, as a sound or a probe, it was opposed by the turbinated bones being almost in contact with the septum, owing to their dilatation.” Subsequent drying of the head showed that that which in the recent state had appeared like enlargement or exostosis, was “owing simply to the dilation of every cell or interstice, all of which were perfectly empty.” “This horse’s case may apply to hundreds. In all probability this permanent unsoundness was the sequel either of severe catarrh or strangles.”

Science is indebted to Mr. Turner for the development of this new fact: although I cannot regard it otherwise than as an *occasional*—not a common—cause of the disorder.

Professor Sewell met with a case of roaring in which he found an exostosis growing from the cervical vertebræ, between the first two ribs, and pressing against the windpipe. The French authors present us with accounts of *polypi* within

the nostrils; a piece of ribbon within the chamber of the nose; a molar tooth displaced, and thrust into the same situation, producing roaring; but for my own part I never met with any cases of the sort.

PULMONARY COMPRESSION?—Hurtrel d'Arboval includes both pleurisy and peripneumony among the causes of the roaring: is such produced by *compression* or bronchitis?

A question has arisen, whether or not we are warranted in regarding the *lungs* as the seat of roaring. The subject being one on which individual experience is necessarily contracted, it is only by an appeal to practitioners at large that such a question can be satisfactorily answered. In my own mind theory would seem to reply in the negative: the following case, however, makes me stagger in this opinion. The case occurred to my late much respected father.

A horse was treated for violent roaring. The neck was repeatedly blistered; it was even fired; but no relief was obtained. So painful was it to hear the animal roar, when he was even gently led out of the stable, that tracheotomy was had recourse to: but without avail. At length, seeing the animal continued to suffer so much pain and distress in breathing, and that the case appeared altogether incapable of being relieved, it was determined to destroy him. On examination, no thickening of the laryngeal or tracheal membrane appeared, nor, in fact, any other disease of those parts. But the lungs were hepatized throughout their substance, and the smaller divisions of the bronchial tubes in many places so compressed that they were hardly pervious.

From the circumstance of the operation of tracheotomy not having any effect in this case, it is obvious enough the cause must have existed *below*, *i.e.* within the bronchial tubes: there cannot, therefore, it would appear, remain any further question about the seat of roaring occasionally being the lungs. In confirmation of this stands the testimony of Mr. James Turner, who says, "I have occasionally ridden some roarers, in which I have been perfectly convinced that the noise issued from obstructed bronchi within the lungs themselves."

NERVOUS INFLUENCE.—In the year 1826, M. Dupuy pub-

lished, in the 'Recueil de Médecine Vétérinaire,' an account of some extremely interesting experiments on this subject. He found that either compression or division of the eighth pair of nerves had the effect of producing roaring; and the rational explanation he gave of the phenomenon was, that as the inferior laryngeal nerves, which supply the dilator muscles of the glottis, are branches of the par vagum, of course those muscles would become paralyzed; while the superior laryngeal, going to the constrictors of the larynx, preserving their power, would contract and cause the glottis to be nearly closed, and thus occasion the animal to roar. Here is a new field opened for observation. We are rarely to expect division or destruction of continuity; but there are changes and accidents that may occasion compression, either of the par vagum or recurrent nerve, on one or both sides. Some French veterinarians have discovered, they say, little ganglions upon the nerve, compressing it. Youatt fancied the pressure of the collar or lower jaw might have the same effect. The formation of a tumour, any where in the course of the nerve, might, perhaps, do it. After all, however, I cannot say I augur any great deal of practical utility from this new light.

SPASM OF THE MUSCLES OF THE GLOTTIS.—Vatel places roaring among "nervous disorders," though he admits there are but few cases in which it is referable to spasm. My lamented friend, Mr. John Field, whose opinion on every point of veterinary pathology was valuable¹, very sagaciously observed, that the frequent cause of roaring, in cases of ulceration of the rima glottidis, is "spasm of the glottis." "While the horse," says Mr. Field, "is suffering great pain from the passage of the air over these denuded surfaces, the instinctive action of the muscles, more powerful than the will of the animal itself, partially closes the air tube, and thus lessens the irritation. I have seen many cases of this kind, and by opening the trachea have obtained immediate relief. The roaring which supervenes during the development of glanders is precisely of this description." To prove the influence of

¹ See Proceedings of Veterinary Association, in the *Veterinarian* for 1837.

the recurrent nerve Mr. Field made the following experiment:—

“Having ascertained that the organs of respiration of a horse (used for farming purposes) were sound, I cast him, and laid bare the recurrent nerve of the off-side, and passed a ligature loosely around it: he was then allowed to get up, and, after a few minutes, galloped severely without evincing the slightest defect in his breathing. The nerve was then drawn out by the ligature, and one inch and a half of it excised; and immediately, on only trotting the horse a short distance, such a degree of roaring was occasioned, that, had the exertion been continued, he would soon have fallen. I kept this horse four years; and, though his breathing became much better, he continued a sad roarer: at the end of that time I destroyed him for the larynx, which exhibited the usual condition of wasted muscles on the side deprived of the influence of the recurrent nerve.”

ROARING, HEREDITARY.—That roarers have both bred and got roarers, I believe there are instances enough on record to prove; but whether this be referable to some peculiar or faulty conformation, or can be regarded as the transmission of the disease itself, is a question which appears yet unsettled. For my own part, I should say experience seems to teach us, that, so far as conformation or liability is concerned, all diseases may prove hereditary; but I have no notion of morbid action being conveyed from parent to offspring unless through the medium of contagion or infection. That habits and vices, however, are so conveyed, there cannot remain a doubt.

Mr. Goodwin, whose observations in these matters must have considerable weight with us, has kindly informed me, in answer to my inquiries, that, to the best of his recollection, the mare called ‘Mary,’ by Precipitate, who was herself a roarer, bred a filly by Sorcerer, also a roarer, and that filly bred a roarer to Waterloo, called ‘Black Jack.’ In opposition to this, however, stands the following fact, for which I am likewise indebted to Mr. Goodwin:—‘Taurus,’ a celebrated racer, a roarer, has covered several mares, and their produce are

all turning out well and have won several races—in no one instance his get having proved a roarer; and notwithstanding that his own family were all notorious for the disease. Mr. Goodwin knows a mare who has produced four crib-biters, though covered by different stallions, and she herself not possessing the vice.

THE TREATMENT OF ROARING is an affair that will employ both our practical and theoretical research. As I said before, unless we can ascertain the *cause* of the evil, and make a shrewd guess at the nature and situation of this cause, we do little more than impose upon our employers, and upon ourselves too, in attempts to remedy it. Towards this end, the first inquiry to be made is, how long the horse has been a roarer. Secondly, whether the roaring followed catarrh, or cough, or bronchitis, or strangles, or distemper of any kind. Thirdly, whether the horse has run in harness, and is in the habit of being tightly reined up, and whether the roaring existed antecedently to his going in harness, or has come on since. Fourthly, by careful examination, to ascertain whether there exists any mechanical obstruction to account for the roaring; or any distortion, or deformity, or unnatural tenderness about the larynx or windpipe. Fifthly, if there be any reason for believing it to be nervous or spasmodic. Lastly, should there appear any chance of the horse being benefitted by treatment, to inquire what is his value or what value his master sets on him—and whether his owner is willing to give him up a sufficient length of time for requisite trial of treatment.

ASCULTATION, carefully practised, will prove very serviceable to us in discovering whence the sound proceeds, and leading, probably, to some better opinion as to what gives rise to it. The stethoscope may be used; but, in general, we shall do better without it. It will be an important step towards treatment to make out whether the cause resides in the head, or the larynx, or the windpipe, or lungs.

A CURE FOR ROARING is what—at least, in the common acceptance of the phrase—we do not possess; nor is it possible for a general cure to be included in any one individual remedy or special set of remedies. That which would tend

to remove it as the consequence of disease, would be entirely inapplicable in a case where it arose from distortion; while those means which seemed best adapted for a case of distortion would, probably, prove altogether inefficacious in one of mechanical obstruction. In fine, any remedy we may possess can only be suited to one description of disease: the art of cure consisting rather in the *adaptation* of the remedy than in the knowledge of it. The only pretensions we, as men of reason and science, can set up towards a cure, are such as are founded on the understanding we may obtain of the immediate cause of the roaring: all other boastings are downright quackery, and, worse than quackery, imposition.

I introduce what follows in this place for the double purpose of showing to what extent the public may be gulled by empirics, and what improvements our art has made, even within these very few years past. Clater, whose works surpass those of White by half-a-score of editions—*ergo*, according to his own account, just by so much *par excellence*—"The rapid sale of *twenty-three large* impressions of this work has established its character upon the *surest* foundation"—these are his words—Clater, I repeat, in 'Every Man his own Farrier,' 24th edit., recommends for the "Cure of Roaring" a few aniseeds and caraway seeds, and a little Dover's powder, mixed with the balsam of sulphur and the yolk of an egg!—altogether about as effectual as White's quills, ammoniac, and aniseeds must prove in broken wind. And yet these are two veterinary works which, for the best part of the last half century, have engrossed the attention of the British public! *Proh pudor!*

With a view of showing the different plans of treatment apart from each other, and of making it intelligible in what kinds of roaring they are respectively applicable, I shall suppose cases of the description that are most likely to come before us, and affix to each of them the proper treatment.

TREATMENT OF ROARING, THE ACCOMPANIMENT OR CONSEQUENCE OF INFLAMMATION.—Should the roaring be recent, and the horse have been lately, or be still, labouring under any inflammatory affection of the air passages—laryngitis,

bronchitis, strangles, influenza, catarrh, or even cough—it will probably be requisite to employ measures which may either have a tendency to withdraw any remaining inflammation or increased action, or to cause absorption of any effusions or deposits that may have taken place in consequence of such inflammatory action. Should emollient means, such as fomentation, poultice, steaming, &c. seem to have done their utmost, and continuance in them appears no longer advisable, issues, such as setons, may prove useful, either through or in the vicinity of the parts affected, on the score of local depletion or derivation. The tissues are likely to be resolved in suspected cases of consolidation, by sweating or else by full blisters; their repetition being indicated when neither resolution nor suppuration has been produced. Instead of blistering such places, however, where causing absorption appears to be rather the indication, ointments of a composition known to promote this are to be preferred. Either strong mercurial ointment with camphor may be well rubbed into the part, in due proportion to the extent of surface, twice a day; or an iodine ointment may be employed; with many practitioners, the two ointments in combination are highly extolled, and I believe with reason, since their efficacy in promoting absorption is universally admitted to be great. The simple and best ointment of this sort is that made with the chemical compound—

R Hydrarg. Deuto. ioduret, ʒss;
Adipis, ʒj. M.

This, mixed with an equal quantity of mercurial ointment, forms an excellent application.

Let this be well rubbed in with the hand once daily for three or four days in succession; when it will be found to produce a scurfy sort of slough of separated hair and cuticle. At this time the friction must be discontinued for a few days, though, as soon as the parts have returned to their former condition, renewed again. This will not infrequently succeed better than blisters, and not only here but in other cases of like chronic tumefaction, condensation, and induration of parts. The absorbent energies of the system may be further roused

by the exhibition of iodine internally: the hydriodate of potash, given in doses of ʒj or ʒij once or twice a day, at the time we are employing the ointment. If this does not succeed, mercurialising the system seems to present itself as a resource; though I, for my own part, have little to say in favour of it. In regard to such treatment as this, however, although it holds out a prospect of success, in a case wherein the roaring is but recent and manifestly traceable to late inflammatory affection—which may be still concealed under the form of an occasional cough, a shortness or pursiness of breath, or some slight fever in the system, lurking about the air passages—it will not, and cannot, prove of any avail in a case in which the roaring has, from its duration, become established, and where all remnant of increased action has for some time past disappeared.

EXCISION OF THE CROSS-BANDS OF COAGULABLE LYMPH.—

It is said—for its truth I cannot vouch—that once upon a time, a veterinarian in performing the operation of tracheotomy on a roarer, had the good luck to cut against one of these bands, and so, like a prudent man, excised it, and thus *par aventure* achieved a cure on the horse whom he had anticipated but to relieve. The circumstance was eagerly caught at as opening a new and successful field to experimenters, and the windpipes of many roarers were most mercilessly slit open in search of similar bands. Alas! so many disappointments followed, however, that the new operation was abandoned for the introduction of a practice which, if it does not offer the same glittering prospects, is, at all events, free from evils that *may* accrue from cutting and slitting-up the windpipe. In fine, this is an operation which, considering the extreme rarity of such cases, no man is justified in performing unless he can practise auscultation to that perfection that he can positively say, bands of lymph *do* exist, and point out precisely the spot of their existence.

TREATMENT OF ROARING FROM TIGHT REINING-IN.—One cannot rationally entertain hopes of cases of even this kind, of any considerable duration. In time, as we have seen,

not only does the distortion of the larynx and windpipe become permanent and irremediable, in consequence of the parts losing all their wonted tone and elasticity, but changes of their structure take place: the muscles shrink and waste away; and the cartilage itself becomes altered—probably converted partially into bone. Should the subject be a harness-horse, and have been in the habit of being tightly borne up, let him for the time to come be driven without any bearing-rein at all; and, in addition to this, when in the stable, let him be bitted to the side-chains or straps, for a couple of hours, twice a-day, in such a manner that his head may be kept continually elevated, and his nose projected forwards, *à la Russe*. This is also the best plan we can pursue in a case where the mischief has been occasioned by any injurious constraint of the head in breaking, biting, or lungeing the horse.

HOPELESS CASES.—As such, in general, may be regarded all cases of long duration, arise from what cause they may. Also such as present any reason for believing to be hereditary, or dependent upon any original malformation of parts. Cases of distortion are equally irremediable when the distortion has existed so long as to destroy the original form and properties of parts, and in their place to have established fresh ones. Such can only be benefitted by—

THE FRENCH TREATMENT, which consists in the performance of bronchotomy or tracheotomy, as we more properly call it. They make a large aperture, and use a proportionably large tube,¹ so constructed and adapted that the animal can not only freely breathe through it, but do his work, even gallop, with it in his neck. Treated in this manner, there are instances on record of very bad roars having been known to have been kept exempt from relapse for two or three years, and at work all the time.

¹ The tube I have used will be found described in the 1st vol. of 'Hippopathology.' Others are now sold which seem preferable.

BRONCHOCELE.

By *bronchocele* is meant hypertrophy, or a state of enlargement of the thyroid gland.¹ It is a disease which is rarely seen in horses. I have met with only three or four instances. In cattle and sheep it is likewise uncommon; but among swine and dogs it is comparatively frequent; and still more so, it would appear, in our own species, and in women in particular, about the age of puberty: a circumstance which has induced surgeons to believe it to be connected with uterine derangement. It is an old and well-established observation, that certain countries and localities are favorable to its production. In England, Derbyshire and Nottinghamshire have obtained this repute; on the Continent, Switzerland, the Tyrol, Valley of the Rhone, and others; and to that extent, to lead us at once to the conclusion, that influence of soil, or climate, or both, must have much to do with its production: an influence to which, we are assured by the French—who call it *goître*—animals are more or less amenable. Old medical writers ascribe its appearance in particular persons to that convenient *fons et origo*, “a scrofulous habit.” Of late years, the disease has been thought to be hereditary; and so strong has appeared the evidence of this in dogs, that Youatt’s forcible expression on this point is, “I am quite assured that it is hereditary.”

IN HORSES, we pretend to know nothing further about it than that a tumour, seldom of any great magnitude, makes its appearance in the throat, just below the part we grasp to excite coughing, either directly in front or inclining to one side, having a circular or an ovoid form, and feeling soft and puffy and moveable, without any flinching or sensibility being evinced by the animal when pressing or squeezing it, and without being the occasion of the slightest inconvenience or disparagement to him, save what may be considered to

¹ For a description of this gland consult my ‘Anatomy of the Horse.’ Its connection with the trachea being intimate, will account for its diseases being considered in this place.

arise from its being regarded as an eyesore. The first case I ever saw occurred in the year 1822. The tumour was about the size of a hen's egg; but I remember my father telling me at the time that he had seen one before, in which it was much larger. A case occurred in my present regiment so late as September, 1844. The horse, the subject of it, named from the man of whom he was purchased, 'Dash,' was brought to me for having experienced a "fit of choking." My assistant at the moment gave him a few hornful of tepid water, and the fit passed off. As I was feeling his throat, however, my attention became arrested by a fulness on the off-side, below the larynx, which I at first thought might serve to account for his choking fit. Examining the tumefaction further, however, convinced me that it was an enlargement of the right lobe of the thymus gland—a *bronchocele* in fact; though it did not appear to me to have anything to do with the choking. By rubbing the swelling daily for the space of six weeks with the compound iodine ointment, made as under, the swelling subsided, and the horse returned to his duty.

TREATMENT.—Should the tumour, on account of its volume, become the subject of medical treatment, I would recommend a trial of iodine. Supposing the case be recent, it might, in the first instance, be advisable to give a brisk purge; after which I would administer, daily, a ball composed of a drachm—which may be increased to two drachms—of iodide of potassium, and, at the same time, rub into the swelling as much of the following simple ointment as is equal in bulk to a small walnut, or, as above, with the compound ointment:—

R Potassii Iodid., ʒij;
Adipis, ʒj. M.

Which is rendered *compound* by the addition of ʒj of iodine. Should the case be a chronic one, and the tumour in consequence of its duration have become firm and hard in its feel, and the iodine fail to influence it, I would apply strong blisters upon it, or, as an ultimate resource, pass a seton over or even through it.

NASAL POLYPUS.

POLYPUS is the name given to an excrescence or tumour growing from a mucous membrane by a narrow part or neck, called its *pedicle*. It is a very rare occurrence in horses. But a single case has come under my own observation. It was brought to Mr. Field's infirmary. A red, flesh-like, globose tumour, having a smooth shiny surface, and being about the magnitude of an Orleans plum, depended out of the near nostril of the horse for the space of three or four inches, there being apparently quite as much or more of its substance within as without the nose. It originated, it was said, in a blow upon the part.

Vegetius has a chapter (xxxviii, p. 177) in his work on the subject "of a horse affected with polypus," wherein he says "the horse will be strangled by the stoppage of the passage of his breath. He will snore, and humid mucus will flow out of his nostrils. Manifold are the dangers of the distemper. I have nothing of my own to offer on the subject. A good article, penned by Youatt, appeared on it in the *Veterinarian* for 1831, under the signature of *T.*, from which I extract the greater part of what follows:—

THE TRUE POLYPUS is attached to mucous membranes, and is usually found in the nostrils, the pharynx, the uterus, or the vagina. It usually adheres to some portion of the superior turbinated bone, or it has come from some of the sinuses connected with that body. It escaped, while small, through the valvular opening under the superior turbinated bone into the cavity of the nose, and there has attained its full growth. The polypus of the quadruped is not the compressible elastic fungous one (*polypus elasticus*), which is described by writers on human surgery as occupying the nostrils of their patients. The bleeding polypus is not known; but the small portion of bloody fluid that often appears at the nostril proceeds either from the vascular mucous membrane with which the tumour is surrounded, or from the membrane of the surrounding cavity abraded by long and violent pressure.

STRUCTURE AND ORIGIN.—Some polypi have a fibrous or almost cartilaginous structure, and others appear to be composed of various little tumours agglutinated together. They are formed originally under or within the membrane by which the nasal cavity is lined; but no better account can be given of the cause of their appearance than that of tumours in other parts of the body.

PEDICLE.—By some means, probably the increasing weight of the tumour, and being in a dependent situation, it is gradually detached from its base, and forces with it the soft and easily distensible membrane of the nose. As the polypus continues to descend, this portion of membrane is further elongated, and forms the pedicle or root of the tumour:—a root it is not, for it is no continuation of the substance of the tumour, but a mere duplicature of its investing membrane. How this may be with regard to the fungous bleeding polypus of the human subject, I am not able to determine. The twisting of the pedicle, and tearing it out by the root, may be a good practice with regard to the human being, but cannot be justified where the pedicle is a mere cord by which the polypus is suspended, and forms no continuation or part of its substance.

SHAPE.—The polypus, when it hangs free within the nasal cavity, is usually of a pyriform or pear-like shape. It is that form which it would naturally assume from the gradual distension of the membrane, pressing on every side of the tumour, and opposing its chief resistance at the base.

ITS WEIGHT varies from a few drachms to three or four pounds.

SYMPTOMS.—Some difficulty of breathing, apparently arising from obstruction of some of the air-passages. A discharge of mucus from one or both nostrils, sometimes highly tinged with blood. Occasionally, pure blood runs from the nose; and there is felt, by the hand placed before the nostrils, an unequal rush of air from one or both of them. Inspection in a full light, discloses, higher or lower in the nostril, the rounded base of a polypus.

CAUTION.—The veterinary surgeon must take care not

to mistake the cartilaginous prolongation of the anterior turbinated bone for a polypus, when he sees it spread upon the false nostril, and enlarged and prominent from the general thickening of the mucous coat; nor the prolongation of the posterior turbinated bone, not quite so much developed; nor any rounded clot of blood which may have escaped through the valve under the posterior turbinate, and be retained there by the separated fibrine. This has been done by men of some repute.

TREATMENT.—The horse must be cast, and the head fixed in a position to take the greatest advantage of the light. The operator must then try to lay hold of the polypus with his fingers or the forceps, or (for these tumours do not possess much sensibility) with the tenaculum. If he cannot fairly get at it by any of these means, he will let it alone. It will continue to grow; its membranous pedicle will become lengthened, and the polypus will descend and be easily got at. I do not know whether this polypus in horses—like the one in men—is influenced by damp and dry weather, so that on one day it is more prominent than on another.

OPERATION.—In bringing down the tumour for operation we must not use any great force. The pedicle being but a duplicature of skin, and not a portion of the polypus itself, may be divided anywhere. Besides, force would endanger the delicate gossamer fabric of the turbinated bone. The tumour brought down, must have a ligature passed round its pedicle, as high up as it can conveniently be placed. If the polypus can then be returned to the nose, the animal will suffer very little inconvenience; and in a few days it will slough off, and the pedicle will contract and gradually disappear. If it cannot be returned, after applying the ligature securely, we may excise it immediately, though it would be better to wait a few hours first. Should bleeding occur, the actual cautery may be resorted to. In very bad cases it may be necessary to slit up the ala or side of the nostril. The false nostril, however, had better not be cut through; it is so difficult to retain it afterwards for union. The incision should be carried along the lateral edge of the

nasal bone, beginning at its apex, which will give a flap convenient to turn down.

A BLEEDING FUNGOUS POLYPUS might require being detached by the forceps or by torsion. In operating thus, let there be no pulling at the root. The pedicle will then give way at the weakest part, and there will follow no hemorrhage, no lacerated membrane or detached bone, to produce malignant ulcer or cancer or glanders. Simple excision is never permitted, on account of the impossibility of stopping the bleeding without the cautery, whose application within the nose is both difficult and dangerous.

VATEL suggests plugging the nostril to arrest any hemorrhage after the operation, and, instead of slitting up the nostril, to trephine the bone. To this latter, however, there are many serious objections.

GOHIER relates a case of a horse who had in his left nostril a polypus as large as a turkey's egg, of a greyish colour and glossy surface, too high up to be reached with the finger, which prevented his breathing on that side, and gave rise to offensive effluvium, and to enlargement of the lymphatic glands, but not to roaring. Gohier slit up the nostril, and, with an iron rod with a notch upon its end, contrived to enclose its neck in the slip-knot of a ligature; in drawing this tight, however—which was of necessity done in an oblique direction—the pedicle was cut through. Little hemorrhage succeeded, although the tumour weighed twenty-four ounces. The slit nostril was sewn up, and cold water injected into its cavity. A copious discharge from both nostrils followed, with swelling of the lymphatic glands. This was met by proper treatment, and in fifteen days the patient was sent out of the hospital. Since then Gohier heard that the running had reappeared.

CHABERT, in his 'Veterinary Instructions,' relates the following:—A horse in a cavalry regiment had been gradually losing flesh, and was quickly and painfully blown at every little exertion. Fetid matter began to run from his off nostril, and the gland correspondent enlarged. The horse was supposed to be glandered by the sergeant farrier,—

there being no veterinary surgeons then in the French service,—and was treated accordingly. After a time, to the confusion and astonishment of the man, a fleshy substance began to appear in the nostril, and which rapidly increased in size. At length a great mass protruded, and the farrier cut it off. No benefit followed; the nostril was still stopped, the breathing laborious, and the horse daily became thinner and weaker. After the lapse of a twelve-month the case attracted the attention of M. Tears, the surgeon of the regiment. He cast the horse, slit up the nostril, when he not only found it completely filled with polypus, and the septum narium bulging into the other division of the cavity; but, from long-continued inflammation and pressure, it had adhered to the membrane of the nose in so many points, and so extensively, that it was impossible to get round it, to move it. He contrived, at length, to pass a crucial bandage around it, and it was torn out by main force. Four considerable portions of the turbinated bones were brought away with it. The hemorrhage was excessive: he however filled the nostril completely with tow, and brought the divided edges of the false nostril together by sutures. In three days they were all torn out by the incessant attempts of the animal to get rid of the obstruction; but the horse eventually did well. The polypus weighed two pounds seven ounces.

CHABERT, in a case which he had himself, of a very large polypus, was obliged to make a hole in the frontal bone, which he contrived to cover afterwards with a leathern shield, attached to the front of both bridle and head-collar. For a long while after recovery the horse ran in a cab.

RIGOT relates a case in which the tumour remained stationary at first for a long time, and then suddenly took to growing. At last it became such a size that it occupied the whole cavity, pushing the septum into the other nostril, displacing the bones, and threatening suffocation. The nostril was slit up; the pedicle cut asunder close to the bone; and the cautery applied to arrest the hemorrhage, and *prevent the reproduction of the tumour.*

A CURIOUS CASE came some years ago before one of the Provincial Courts of France. A farmer purchased a four-year-old horse at a fair. A slight discharge was observed from one nostril, with some thickness of breathing. This was not thought extraordinary as it was the *strangle age*. The horse became worse, and at length could not be used. The case was tried. A veterinary surgeon deposed that there was a polypus in one of the nostrils, but so high up that it would have escaped his observation had he not been particularly directed to it, and that he believed it existed at the time of purchase. On this the court determined that the horse should be returned, although the term of warranty had expired, on the ground that it was one of those obscure cases of unsoundness the existence and nature of which could not have been discovered within the prescribed time.

HEMORRHAGE FROM THE NOSE.

EPISTAXIS — as the flux of blood from the nose is technically called—occurs now and then in horses; and when it does happen, the blood commonly comes but from one nostril: a circumstance which of itself may be regarded as an important distinction between epistaxis and *hæmoptysis* or hemorrhage from the lungs. There may be a stream of blood, or it may issue only drop by drop. In either case, it is very apt to collect within the chamber of the nose and about the nostril, where it occasions irritation, and causes the horse to snort and blow out clots of blood; and thus, by opening the sources afresh, is produced, renewed and augmented hemorrhage. As to the blood itself, its character is mostly arterial, its colour being generally a bright scarlet.

The CAUSE of the hemorrhage is sometimes constitutional, sometimes local and accidental. When the bleeding cannot be ascribed to any local irritation or injury, it is said to be *spontaneous*; under which form it may, in general, be referred to a surcharged condition of the capillaries of the Schneiderian membrane, either from determination of blood

to the head, or as the consequence of general plethora of the system. The injected reddened condition of the conjunctiva and Schneiderian membranes will go far to confirm this view of the case; added to which, there may be observable some unusual action of the carotid and temporal arteries; also, the subjects themselves will be found to be in high condition or loaded with fat, and in insufficient or irregular work. Troop-horses, brewers' horses, and horses kept for pleasure, are most liable to spontaneous hemorrhage. We hardly see it in very young horses, or in such as are poor and hard worked. The other form, *traumatic hemorrhage*, that which arises from injury, wound or lesion, occurs, perhaps, the oftenest. A blow upon the nasal bones, from a stick or the but-end of a whip, from any contusion, in fact, will be very likely to excite hemorrhage, and should a vessel of any magnitude become ruptured or wounded, the flux may be such as to endanger life; though I never myself saw a case of the kind. D'Arboval says, it may be occasioned by the pressure of the collar in laborious draught. We have often seen bleedings from the nostrils in the latter stages of glanders, but never to an extent to occasion alarm.

DOES EPISTAXIS EVER PROVE FATAL?—I never witnessed, nor do I know of any report of, such a case myself: D'Arboval, however, informs us that, should the animal die, on exploring the chambers of the nose we shall find more or less blood collected, and some of the clots so changed in appearance as to resemble pus.

DIAGNOSIS.—When we see hemorrhage from the nose, our first inquiry should be into its source: whether it come from the nose simply, or from those important organs, the lungs. In hæmoptysis, the blood commonly issues from *both* nostrils, and comes away *frothy*, and in some cases mingled with *mucus*. Again, bleeding from the lungs is apt to create a great deal more irritation: the horse will be uneasy, breathe hard, and quick perhaps, and sometimes cough violently; and when he coughs, will throw blood up into his mouth: the more the head is depended, the readier the blood flowing out.

OUR TREATMENT must be such as is adapted to the circumstances of the case. In slight hemorrhages none other but repose and abstinence will be required. Should the hemorrhage be considerable, and appear to result from plethora, the grand object will be to lower the heart's impetus. We must, therefore, bleed largely, and from a large orifice in the vein. The best local treatment is dashing buckets of very cold water upon the head, or the application to the sides of the nose of ice or snow, when either can be procured. Should the blood issue from one nostril only, that cavity may be plugged up with tow dipped in a solution of alum; or, should the patient not be able to bear the plugging, the same solution—which I believe to be the best styptic—may be thrown up the nostril with a large-mouthed syringe.

In a traumatic case, the injury—whatever it be, wound or contusion—will require our first consideration, as being the immediate cause of the hemorrhage. In so far as concerns the bleeding, providing the loss of blood be not such as to create any alarm, the patient may possibly be benefited by it, in having to undergo less febrile and inflammatory action afterwards; should it, however, continue beyond this, we must inject and plug the nostril, and apply sudden cold, and bleed or nauseate, or both, according to circumstances. Such measures as slitting up the nostril, and applying the actual cautery or a ligature, supposing the vessel could be reached, are rarely, if ever, necessary.

In regard to internal medicines for protracted or frequently recurring hemorrhages, we may give, in pretty full doses, the oil of turpentine, for which practice we have no less authority than that of Dr. Copland.¹ In the *Lancet*, for July 11, 1826, is an instance related where prompt and decided benefit was conferred, in a case of hemorrhage from the bowels, by the use of Ergot of Rye, given in the form of Battley's Solution of Secale.

In hæmoptysis, hepatorrhœa, and hæmaturia, Mr. Rogers,

¹ Turn to his article, 'Hemorrhage from the Lungs,' p. 125.

of Knightsbridge, highly extols the employment of Acetate of Lead, in doses of ʒij, daily, if required, from which he adds, no fear of harm need be apprehended so long as its conversion into carbonate of lead is guarded against by the use, for its solution, of distilled water, or of common water to which acetic acid has been added. "I have never known," says he, "a case of hæmoptysis which has not immediately yielded to it."¹

¹ The 'Veterinarian' for April, 1853, vol. xxvi, p. 193.

SECTION VII.

DISEASES OF THE LUNGS, PLEURA, AND DIAPHRAGM.

BRONCHITIS	EFFUSION
CONGESTIVE PNEUMONIA	PLEURO-PNEUMONIA
ACUTE PNEUMONIA	HYDROTHORAX
SUB-ACUTE PNEUMONIA	ADHESIONS
CHRONIC PNEUMONIA	HÆMOPTYSIS
CONSUMPTION	EMPHYSEMA—BROKEN WIND
ACUTE PLEURISY	SPASM OF THE DIAPHRAGM
CHRONIC PLEURISY	RUPTURE OF THE DIAPHRAGM.

Causes of Pulmonary Disease—Diagnosis—Percussion and Auscultation.

CHEST affections in horses bear even a greater proportion to the number of their other diseases than in our own persons. Putting accidents and lamenesses out of the question, we shall find a large majority of the cases presented to us for treatment to be diseases of the respiratory apparatus; and the most fatal of them to be those which attack the lungs and their enveloping membrane, the pleura. These diseases also evince in horses a rapidity of destructive course which is not so conspicuous in men. In our bodies, they are rather apt, by slow degrees, to bring their victims to their end; while they will hurry horses off even after but a few hours' duration, and in despite, too, of every measure that medical skill can devise. This, of course, on our part, calls for corresponding alertness and decision in our therapeutics; and the more so, seeing that it is not only required of us to save life, but to save organs, and in that normal state too in which they may be so fit to carry on their functions that the animal is able to do his work nearly or quite as well as ever. If he be left with imperfections in his wind, I am afraid we shall derive but little credit from his cure, even though we may have been the means of preserving his life.

PREDISPOSITION to pulmonary disease is observed to exist in horses of certain age, form, and temperament. Young

horses on becoming domiciled are incomparably more subject to it than such as are aged and seasoned. And horses that are high-bred and tenderly reared, and have light carcasses, long legs, flat sides, and breasts so narrow that both fore-legs seem as though they “emerged from one hole,” and who possess thin skins, are indisputably more susceptible than those of a different breed and opposite conformation.

The CAUSES OF PULMONARY DISEASE will, in a general way, be found in the air horses breathe and in the work they perform; in fact, they may be said to date their probable rise from the day the animal is taken into the stable and made the servant of man—in one word, from his period of *domestication*.

The AIR the horse is compelled to breathe while confined in his stable may be *cold* or *heated*, *moist* or *dry*, *pure* or *impure*, considered in relation to the atmosphere out of doors. There can be no doubt that either excess of temperature—cold or heat—must have an excitant operation on the membrane lining the respiratory passages; and yet it is a notorious fact, that horses usually enjoy vigorous health in frosty weather. Cold with damp, however, has certainly an unfavorable operation. Wet springs and autumns are commonly productive of a good deal of sickness. Is this to be ascribed to any direct effect upon the air-passages, or is it to be attributed to some operation upon the skin?—and particularly since these are the moulting seasons? In the latter case, the lungs become secondarily or sympathetically affected. Even here, however, we appear to require the presence of some stimulant—such as heat or foul air—before disease will show itself; for horses out in the open air during such insalubrious seasons, rarely, if they do at all, contract the prevailing malady. In a general way, and in regard to its direct operation upon the bronchial membrane, cold must be regarded as a predisponent to disease; and not so much cold by itself, as cold with humidity, or even a particularly drying cold: the probability being, that the effects are not owing simply to any sedative operation the cold may have on the membrane, but also to the operation it has upon it as

a surface emitting, and constantly covered with, a mucous secretion. Cold, then, with either more or less moisture than is usually contained in the atmosphere, being considered as the predisponent, our next inquiry must be after the immediate excitant. The late Professor Coleman was in the habit in his Lectures of attributing great influence to the foul air engendered in stables by effluvia from the dung, urine, and breath; and perhaps, in combination with heat, there exists no more fruitful source of disease of the respiratory apparatus: but I have my doubts whether foul air without heat be often productive of such effects. At the time I did duty with the army in the Peninsula, I remember well, that most of our stables, or places used as stables, were dirty and filthy in the extreme, being either without any pavement at all, or so badly paved that they were full of holes; and of course there was nothing like drains or sewers to carry off the urine: indeed, in many places they were all but roofless, and in most places in a dilapidated condition. In these situations the horses and mules of the army bred farcy and glanders and mange, but very rarely bronchitis or pneumonia or pleurisy. This corresponds with what is observed to be the effect of foul air on the human subject, viz. that it tends to engender *malignant* rather than common inflammations, of which typhoid, gaol, and putrid fevers are examples.

COLD—or wet producing cold—applied to the surface of the body may, however, by causing a reflux or congestion of the blood inwardly, have a sort of indirect operation in producing pulmonary inflammation. There can be no doubt about the correctness of this reasoning, nor of its occasionally happening in practice; but I do not myself believe that it happens near so frequently as is thought or represented; else would many more racers and hunters, and post and coach horses, and others, fall victims to thoracic disease than now are known to do. Our surprise is, how the poor slave who is galloped one hour until dripping with sweat and nearly exhausted, and the next half-hour stands tied to a post, exposed to the cutting blast or pelting shower, while

his master is engaged in business or pleasure, can possibly escape; for escape he probably would, even to the last, were it not that he had to encounter when he shall have arrived home—what to him may feel most comfortable, but what in reality excites disease in him, viz. his hot foul stable.

OVER-EXERTION OR HARD WORK may induce pulmonary inflammation. The horse, whose case we have been imagining, may, the moment he shall have arrived home, or very shortly afterwards, experience an attack of pneumonia. Or, I will suppose another case, a very common one:—A gentleman shall purchase a four or five-year-old horse of a dealer, which at the time of sale is in fine, fat, sleek condition. Through ignorance or inexperience on the part of his new master, the horse is immediately put to work, and speedily afterwards is attacked with pneumonia, of which he dies. The gentleman brings an action against the dealer for the recovery of the value of his lost horse, and the result is that he obtains the action; though most unjustly, since, in all probability, the animal was in perfect health and soundness at the time of purchase, and lost his life entirely from the mismanagement of his purchaser. At the same time, no other blame than want of knowledge could morally be imputed to him. It was formerly the custom in the army to put all recruit-horses to severe work in riding-schools, and the consequence was, numbers became lost to the service: now, however, that a mild and progressive system of manege is practised, the mortality arising from this cause has quite disappeared. Any act of sudden or violent exertion, such as a “splitting gallop,” or a “burst,” is likely to cause a congested state of the lungs, under which the horse sinks asphyxiated, and in that condition, unless immediately relieved, dies. This is not inflammation, though a state very apt to be followed by inflammation, supposing the animal to survive the original shock.

INJURIES, mechanical or chemical, may prove the cause of pulmonary disease. It is possible that the enveloping membrane, or even the parenchymatous substance, may suffer preternatural extension and laceration from violent and

convulsive efforts for breath, under certain bodily exertions, such as racing, leaping, plunging, &c. Contusions from falls or blows upon the side may injure the pleura; fractures of the ribs or sharp instruments may wound the pleura, or lung, or both. And as for injuries of a chemical nature, in this light may be viewed the several pollutions the atmosphere of the stable receives from the effluvia of the dung, the urine, and the breath of other horses. Ammoniacal gas is said to prevail in the vapours from these excretions; and, consequently, there can be no question about the operation of such an atmosphere being highly excitant and creative of inflammation.

DIAGNOSIS.

Upon the diagnosis will the treatment depend.

In the study and observation of diseases of the pulmonary organs our chief aim must be to attain such intimate knowledge of them as will enable us not only to make the necessary distinctions between them, but to so far ascertain the nature and stage of each as to render us competent to treat it under the circumstances, to the best advantage, and at the same time give an opinion to be relied upon in regard to its result. Certain symptoms are common to almost all these diseases: that, however, which of all is, if not the most common, the most important, is altered or disturbed respiration. And there are so many degrees and kinds of alterations in the breathing, that they of themselves, by attention on our part, may be rendered of great value to us in the formation of diagnosis.

RESPIRATION in health is shown by a placid, uniform, regular, and hardly perceptible motion of the flanks, at the rate, according to Delafond, of from 10 to 12 breathings a minute in young horses, from 9 to 10 in old; according to the late Professor Sewell, of from 4 to 8. If horses in the stable are referred to I cannot but regard the latter standard as much too low. Delafond has given us what he calls a "synoptical table of the different kinds of respiration," from which we may gather some useful practical observations, with-

out pretending to adopt all his finely-drawn distinctions. He makes a division of the different kinds of breathing, relatively, into—

1. Acceleration or retardation.
2. Depth of inspiration.
3. Difficulty of performance.
4. Modifications of these.
5. Accompanying sounds or noises.

FREQUENT RESPIRATION is common to all pulmonary diseases, and to most fevers and painful irritations; quick and intermittent breathing denotes sharp and colicky pains in the chest or belly; slow breathing is perceived in cerebral affections; and slow and irregular, in pulmonary emphysema.

DEEP INSPIRATIONS betoken confirmed hydrothorax; short ones, which constitute quick respiration, are signs of pleural or peritoneal or irritative pains.

DIFFICULT OR LABORIOUS RESPIRATION characterises acute laryngitis and bronchitis, pulmonary congestion, and all those cases in which obstacles in the air-passages, or other impediment, embarrasses the breathing.

UNEQUAL RESPIRATION has one inspiration deep, another not. It becomes IRREGULAR where the intervals are unequal; INTERMITTENT when the breath is held or suspended; INTERRUPTED, when that suspension takes place in the middle of an inspiration or expiration; interscinded, when suddenly arrested, and converted into a convulsive action of the flanks or catching of the breath. This last is present in broken wind, though it is in particular characteristic of pulmonary emphysema, and diseases of the heart and pericardium.

SIGHING RESPIRATION.—This kind of respiration, not mentioned in Delafond's account, is one which, strictly speaking, arises neither from difficulty nor pain in drawing breath, nor from any pain or irritation in any particular part, but from general excitement, or rather a *general feeling of distress*. It is characterised by a sort of sighing, grunting noise, and is indicative of great over-excitement with distress at the time, to end in a directly opposite state, one of depression, exhaustion, and death. It is peculiar to the over-marked horse. And it may be called—until we get a more appropriate name for it—*sighing respiration*.

PAROXYSMAL RESPIRATION, as we denominate it, is the occasional increase in the frequency and embarrassment of the breathing which is sometimes seen in horses labouring under bronchitic affections, more especially in the seasons of Influenza. At one time the horse is breathing with no more than ordinary or usual disturbance under the circumstances of his disordered state, while the next hour, or minute even, his respiration appears flurried, as though he had just received some fright or shock. Wait a short time however, and the commotion will subside. We believe this excitement to be *nervous*. It is not relievable by either venesection or æther or laudanum. It must have its spend, and then will gradually disappear.

The EXPIRED AIR is also worthy of our observation, as a farther test of the nature of the disease present. In all animals, its temperature—ascertained by holding the hand before the nostrils—is a little below that of the body. In frequent respiration, sympathetic fever, bronchitis and acute pneumonia, the breath will be *hot*. In all chronic diseases, and particularly in tubercular phthisis and in pleurisy, both acute and chronic, it will be *cold*. The breath, inodorous in health, may, under disease of the air-passages or lungs, acquire certain odours. In pharyngeal affections, in caries of the bones, and vomicae discharging through the bronchial tubes, the breath becomes *fetid*; but in gangrene of the lungs, even *putrid* in odour.

PERCUSSION AND AUSCULTATION.

For years past both these means of exploration of the cavity of the thorax have been practised by veterinarians as tests of the presence of water: it is only, however, since the brilliant lights thrown upon the subject by the immortal Laennec, that we, in common with surgeons, have derived much advantage from them; and even now it is to the practised hand and ear alone of the man of accurate observation and multifold experience, that percussion and auscultation will yield in hair-clothed animals their full products. On this account we prefer giving the practice of a French author,

Delafond, who appears to have had, and to have profited by, extensive opportunities of observation, to relying upon what little we have to offer of our own ; since in our hands, to say the truth, the practice has not proved prosperous. We give what follows, from Delafond, more with a view of throwing out some guides in the way of practice for those who may be desirous of cultivating the science, than from any utility or real value we are afraid they will be found of. It has been observed, by some French writer, that to derive the fullest advantage from auscultation, the man ought to visit his patient (the horse) at midnight, when all is still and silent around him ; and there is much truth in the remark, since it is most difficult to find time and place which during the day is free from sound or noise of some description or other. One thing is most needful in the commencement of the practice both of auscultation and percussion, and that is, to make our ear familiar with the sounds of health, the *normal sounds*, in order that we may run no risk of confounding them with the *abnormal* or diseased sounds.

NASAL CAVITIES.—The ear, applied to the nostrils of horses, even during repose, recognises such a sound as condensed air streaming through some hollow tube would produce ; but through the parietes of the nasal chambers, or through the sinuses of the head, no sound whatever can be detected, either by the ear or the stethoscope ; unless after exertion, and then a sort of snoring sound is heard in the former, while in the sinuses a soft murmur only is audible. A tumid condition of the Schneiderian membrane gives rise to the sound of thick wind, which, augmented, becomes whistling ; and this may exist either on one or both sides. Sounds emanating from the larynx, windpipe, or bronchial tubes, or even from the recesses of the lungs, sometimes retain their force to that degree within the nasal chambers as to lead us to believe they arise there. Such mistakes are easily corrected by applying the ear by turns to the larynx, neck, and chest, the sound being greatest opposite to where it is produced. Snorting, which may be excited at any time by momentarily closing the nostrils, and which is occasionally thus produced to cause the ejection of matter from the nasal chambers, may be put in practice by way of further testing the seat of sound.

The **SINUSES of the HEAD**, tested by percussion, either with the finger doubled, or with a key or a piece of wood, or, what is better, with a small hammer and a light wooden shield interposed, yield in the young

horse but indistinct resonance; the sound is plainer in the adult, but loudest of all in the old: a difference no doubt ascribable to the changes the sinuses undergo with age. As the resonance of the nasal chambers is diminished by the presence of polypi, or the accumulation of pus, so is that of the sinuses by even but a small purulent collection. Purulent repletion completely deadens sound. At the same time, percussion becomes painful, and the frontal bone often convexed.

The LARYNX, in a state of health, yields but a faint sound to the ear. Under disease, however, we may with Leblanc regard the anormal sounds as consisting,—1st. In a *dry whistle*, which is the result of contraction, either from confirmation or compression, or of physical or vital lesion of the recurrent nerve. 2d. In a *humid whistle*, the consequence of a tumid membrane covered with mucus, which is sometimes intermittent and accompanied with a gurgling noise or mucous *râle*, as in acute laryngitis. 3d. In a *râle*, which may be either dry or humid, audible either at the beginning or decline of laryngitic inflammation.

The WINDPIPE yields but little to our listenings, unless it be at the superior and inferior parts. At its entrance into the chest, in the normal condition, is heard the sound of soft blowing, most prolonged during expiration. This respiratory sound, which is occasioned by the air returning from the bronchial tubes into the windpipe, we call, from its situation, *tracheo-bronchial respiration*. Frequency of respiration increases it. When liquids become effused into the bronchial tubes, the *mucous râle* is heard; and this is often accompanied by the *sibilous râle* and by the *sonorous râle*. In case of effusion of blood into the tubes, the *râle* is *spumous*.

The THORAX affords no information to the feel, except in the case of pleurisy, and then the animal sensibly flinches from pressure sharply applied against the intervals of the ribs. Oxen will even moan from the pain so occasioned. Neither *admeasurement* nor *succussion* of the chest produces any satisfactory results.

PERCUSSION of the THORAX means striking or tapping its sides with a view of judging, from the different sounds elicited, of the normal or anormal condition of the organs within. The chest is said to *resound* when the vibrations raised by the shock extend throughout the chest and the contained viscera; on the contrary, when they appear confined to the place struck, it is said *not to resound*, or that the sound is *dull* or *dead*. The shock occasioning the vibration may be *direct* or *indirect* in its application, it being in the latter case conveyed through some intermediate body: hence the distinction between *mediate* and *immediate percussion*.

IN the PRACTICE of PERCUSSION, Leblanc makes use of a small iron hammer and a wooden guard or shield, the latter covered with India-rubber upon the surface to be applied to the chest. The sound thus produced exceeds that elicited by any soft body, such as the hand, against the equally soft skin. Such an apparatus, however, is apt to raise *two*

sounds, and, in consequence, Delafond after many trials relinquished this—as well as another somewhat similar contrivance of his own—for the use of the hands simply. The parts to be sounded may be struck back-handed, with the knuckles; or both hands may be employed, one serving as the mediator. In fact, in animals, mediate percussion has advantages over immediate, not only on account of the external soft parts being thereby compressed, and themselves contributing to the sound, but also because we are able with more precision to test certain places where sound is but very indistinct, as around the cartilaginous borders of the ribs. Notwithstanding this, for the common purposes of practice, Delafond prefers immediate percussion, to be practised with one hand alone; and in performing it, he recommends attention to these rules, viz. First: Let the shock or stroke be given *perpendicularly* to the surface to be sounded: an oblique stroke would deaden the sound. Secondly: The ribs themselves are to be struck, and not the intercostal spaces, bones being better producers and conductors of sound than soft parts. Thirdly: In striking or tapping, the same force should be employed against every part. Fourthly: The same practice, in regard to manner and place, should be strictly observed on both sides of the chest, in order that any comparisons made may be correct.

PECTORAL SOUNDS will be found to vary according to the region of the chest percussed, the age of the animal, its condition, the full or empty state of its bowels, and its peculiar conformation and organisation. Even when all these circumstances appear alike, resonance may be considerably greater in one animal than another. The chest of the horse admits of being percussed either upon the right or the left side, from behind the shoulder as far as the last rib: with a view, however, of rendering the different sounds and their modifications distinguishable, it will be best to make some division of this space. Suppose we draw an ideal line, corresponding with the posterior border of the shoulder, and another in the direction of the last rib: the interval between these two fixed boundaries we divide by three horizontal lines into three equal parts, which we designate *regions*, superior, inferior, and middle. The superior region extends from the scapular line to the last rib, along the border of the longissimus dorsi, and includes the superior third of the superficies of the ribs. The inferior region is marked by a line running from the elbow along the superior border of the pectoralis magnus, the insertion of the external oblique muscle and cartilages of the false ribs, and comprehends the inferior third of the said space. The middle region comprises the middle third, between these two lines.

A DIFFERENCE IN THE RESULTS OF PERCUSSION of the chests of men and quadrupeds, arises from the circumstances of the one being *horizontal*, the other *vertical*, in position, and of that of the horse in particular having those large intestines, the cæcum and colon, as well as the stomach, conti-

guous to the diaphragm; whereas in man, the stomach *alone* partly lies within the boundaries of the chest: these hollow viscera necessarily affecting the sounds elicited by percussion of the posterior or inferior parts of the chest. Had M. Leblanc taken these anatomical differences into account, he would not have allowed himself to run into error as he has done.

THE SOUND OBTAINED BY PERCUSSION is loudest in the middle region, between the 7th, 8th, and 9th ribs. From this to the 15th rib it diminishes; but again increases from this all the way to the last rib. Along the right superior region the sound grows louder from the posterior border of the shoulder to the last rib; whilst on the left side it gradually diminishes along the same line. This difference cannot be explained but from the circumstance of the arch of the colon projecting so far into the chest, this being particularly observable in long-carcased horses. It shows the incorrectness of Leblanc's general rule for ascertaining the nature of sounds, viz. comparing those of the two sides. In the inferior region, the sound obtained upon the 6th rib may be compared to that of the superior region behind the shoulder: this holds as far as the 9th rib, from which point to the last rib the sound gradually lessens, until it becomes abdominal. On the right side the sound is found somewhat duller, on account of being opposed by the liver. After all, however, what with the shoulder and the different muscles clothing the chest, and the cartilages of the ribs, which themselves afford little or no sound, there is really not more than a third of the chest of the horse available for the purposes of effectual percussion; a fact which may very well explain the little advantage veterinarians have hitherto derived from the practice of it. The chests of old animals afford more sound than those of middle-aged, and these latter than those of young subjects: differences owing to diminished density of lung and more stability of rib in the aged animal. Lean horses, or such as are empty-bowelled, afford more sound than fat ones, and such as have full stomachs.

We are not to suppose that it is enough to have made ourselves acquainted with the variations of sound of the healthy chest, in order to understand those of disease: much practice is required to estimate the value of sounds; and, after all, percussion itself is often insufficient, unaided by auscultation.

The resonance of the healthy chest may be augmented, diminished, or annihilated. It is augmented throughout the posterior lobes of the lungs when they are emphysematous. Effusion into one pleural sac augments the sound of the opposite one: that lung being compelled to admit more air, becomes more resonant. It is diminished during congestion, inflammation of the parenchyma, and tuberculous phthisis, when much of the lung is diseased. The sound is lost or becomes dead under effusions. This deadness may be on one or both sides, or may be confined—as is

ordinarily the case if the effusion be recent or inconsiderable—to the inferior part. It will increase or diminish according to the progress or diminution of the effusion. There is no measuring the effusion by sound; but we may throw it by the position of the animal into a place where percussion can easily detect it. M. Leblanc observes that, taking absence or deadness of sound to indicate the presence of water, the lungs are supposed to be permeable; otherwise, the deadness might as much depend upon density of the pulmonary tissue as upon the presence of water; still, there is a method of ascertaining from which it proceeds, viz. by placing the horse in that position in which the fluid will accumulate in the fore part of the chest, and then, should the posterior part still utter a dull sound, we may conclude that the lungs are hepatized. Furthermore, the dead sound may be partial, owing to local pulmonary condensation, circumscribed indurations, &c. &c.

AUSCULTATION.

Auscultation—from *auscultare*, to listen—consists in the perception, by the *mediate* or *immediate* application of the ear, of the different sounds generated in the lungs, with a view of determining the normal or anormal condition of those organs, and, in the latter case, of aiding our opinion on their diseases.

MEDIATE AUSCULTATION is effected through the intervention of the stethoscope; *immediate*, through the direct application of the ear to the air-tube, or to the walls of the cavity of the chest. We prefer immediate to mediate auscultation for the following reasons:—1st, the stethoscope is extremely inconvenient to apply; 2dly, supposing, however, this were not the case, the stethoscope possessing no power of augmenting the sound, but only being the means of conveying it more directly to the ear, no advantage attends the use of such an instrument; 3dly, in human medicine, the application of the ear would prove objectionable both to surgeon and patient, hence by the surgeon the adoption of the stethoscope: this is not our case.

IMMEDIATE AUSCULTATION.—During examination the animal should be kept quiet: his attention being engaged by a little hay or corn. During the silence of the night is the auscultator's best time. The ear should be lightly and accurately applied. After all, should the sound remain indistinct, the respiration may be increased by exercise. The nasal cavities, the larynx, the trachea, and the lungs, are the parts to be auscultated; and the modifications of the healthy sounds must be well studied in order not to confound them with such as arise under disease.

THE RESPIRATORY MURMUR is the normal sound heard within the parenchyma of the lungs during the entry and exit of the air, or rather at the time of their healthy dilatation and contraction. This sound is difficult to describe: once heard, however, in a young well-bred lean

horse, it is not likely to be forgotten: by exertion it may be rendered still more characteristic. In a state of health even, it will be found to vary with age, condition, temperament, and breeding. In the young it is strongest. In human practice, its intense sound in infants is designated *puerile respiration*. Leblanc proposes in young animals to call it *juvenile*. In the aged it is hardly perceptible. The disposition of the pulmonary air-cells in the young, adult, and old animals, as shown by Majendie, admits of satisfactory explication of these modifications. If in young animals the air-cells be more numerous and smaller, the sound ought to be stronger, from the air entering into more places and through more circuitous routes. If, on the contrary, as in the old, the air-cells be larger and less numerous, there must be less dilatation, and more free passage of air, and consequently less sound. Laennec's explanation is different from this. He supposes the air-cells not to be capable of equal expansion in the adult animal, in consequence of their sides becoming hard. The feeble murmur heard in pulmonary emphysema, wherein the air-cells are dilated or distended, favours our view of the question. In fat animals, cart-horses especially, and such as are of a lymphatic temperament, whose chests are covered with thick skins and abundance of cellular tissue, the respiratory murmur is scarcely perceptible. In these cases, one must have recourse to exertion. Drs. Chomel and Beau, the last in particular, have a notion, that the murmur is produced by the reflection of the shock the column of air receives against the fauces or glottis, back into the ramifications of the bronchi. But how can such a theory explain the supplementary murmur in one lung when the other is hepatized, unless it be by a sound more vesicular—stronger—in the healthy lung; and in the superior part of the lung when the inferior is no longer permeable to air. Besides, if tracheotomy be performed, and afterwards the nostrils sewn up, the murmur is still heard, although the animal is respiring through an aperture below the place where, according to M. Beau, the collision happens which produces the sound in question. The respiratory murmur will be found to vary according to the region of the chest auscultated. In the middle region it is heard distinctly behind the shoulder, increasing a little thence to the ninth rib, afterwards gradually decreasing to the last. Along the superior region the sound is quite distinct, as well as below and behind the cartilage of the scapula—behind a mass of fat lodged there in fat subjects. At this place we have invariably found the murmur louder than elsewhere, and we ascribe this to the passage of the air through the larger divisions of the bronchi, they being situated hereabouts: to it we give the name of *bronchial respiration*; thus making a distinction between it and the murmur. Along the inferior region the respiratory murmur again becomes distinct enough from behind the elbow to the ninth rib; whence it diminishes to the seventeenth, and is there lost. The sound is the same on both sides,

with the exception of the place on the left side which receives the heart's pulsation. We must take care not to confound the slight crepitating noise occasioned by the subcutaneous cellular tissue—which is called the *dry crepitous râle*—with the murmur. We must also distinguish the sounds of the bowels, which are characterised by their rumbling and travelling about from place to place.

MORBID SOUNDS.—Disease modifies the healthy sound in such a manner that the murmur may become *diminished, extinct, augmented, attended or superseded* by other sounds.

DIMINISHED MURMUR.—*Accumulated mucus* within the large bronchi—as in bronchitis—may temporarily lessen the murmur, though it returns after expectoration. *Capillary congestion* within the parenchyma, before the onset of inflammation, equally occasions a considerable diminution of the respiratory murmur, speedily succeeded by the crepitous râle, should the inflammation continue. The diminution may be partial or general: rarely the latter. Acute enteritis and peritonitis, and in general all violent abdominal pains, accompanied with a short quick respiration, occasion a notable diminution of the murmur. The same remark applies to all diseases about to end in death.

ABSENCE OF MURMUR is owing, in certain conditions of the lungs, to the non-penetration of air into the air-cells. This may be the result, 1st, of effusion into the parenchyma; 2dly, of induration; 3dly, of the presence and development of tubercles, or other accidental productions; 4thly, of displacement and compression of the lungs by fluid effused into the chest. The loss of sound may be partial or general. It will return on the air-cells becoming permeable again.

AUGMENTATION OF MURMUR will accrue from accelerated respiration after exercise. Should this happen during rest, it is likely to result from dilatation of the heart or large vessels; in which case the sound is loud, and is heard throughout the lungs. Should the sound be louder in one lung alone, or in places only of both lungs, it is owing to a morbid state of lung; it being in the latter case in general referable to non-permeability of certain parts of the organ. In such a case as this, it is probable that the healthy portions of lung in some measure compensate for the diseased parts, in admitting a larger quantity of air. For example, should the left lung become hepatised, the murmur in the right will become augmented; the same as partial hepatisations will cause an increase in the surrounding healthy parts of the same lobe. In all cases, this augmented sound takes the name of *supplementary respiration*. Again, the breathing becomes supplementary, and to a remarkable degree, along the superior regions of the ribs, in pleurisy affecting either both sides or one only, followed by effusion, at the time that the lung, still permeable, becomes pressed by the fluid into the upper parts of the chest.

RALES OR RATTLES is the name given by Laennec to such unnatural sounds as may attend the entry or exit of air through the air-passages. This term, which has been restricted in its signification to the noise heard in the windpipe just before death, must here be considered to apply in a general way to every anormal respiratory sound. In respect to the places whence proceed these pathological pectoral sounds, they have been classed as follows:—

Bronchial Sounds	{ Humid or Mucous Râle, Dry Râle, Bronchial Respiration.
Pulmonary Sounds	{ Crepitous Râle, humid or dry, Sibilous Râle, Cavernous Respiration.
Pleural Sounds	{ Gurgling or gurgling Sound, Rumbling or grumbling Sound.

The **MUCOUS RALE** issues principally from the bronchial tubes. It may be compared in sound to the bursting of bubbles of air occasioned by blowing through a pipe into soapy water. It is caused by the presence of mucus or other fluid. Its existence will be temporary or permanent, according as the mucus or fluid continues or not within the tubes: sometimes it becomes converted into the sibilous râle. Cough excited by compression of the throat, by occasioning the expectoration or displacement of the mucus, sometimes extinguishes these sounds; at other times it creates them. Frequently an accumulation of mucus within one large or several small divisions of the bronchi will cause suspension of the respiratory murmur in the interior of the lung, leading one to believe the lung is hepatised: one only need trot the horse, however, to dissipate any doubts on this head. According as the air meets with resistance from the density of the secretions will the bubbles thereby created be large or small. Large bubbles ordinarily occasion a noise like the crackling of a pump-sucker falling after it has been raised. The same sound often accompanies the sibilous râle. It is observable in catarrhal bronchitis when plastic mucosities abound. This sound is heard most distinctly behind the shoulder, opposite to the large divisions of the bronchi: at times it is audible even at the termination of the windpipe.

The **MUCOUS RALE WITH LARGE BUBBLES** becomes perceptible in simple bronchitis and in the second stage of broncho-pneumonia. It is also created by the effusion of fluid into the bronchi, in consequence of destruction of the cartilaginous rings, either from mortification or the bursting of vomica or abscess into the pipe; in which latter case the râle becomes *cavernous*. *Small bubbles* are formed when the fluid possesses but little viscosity, or becomes frothy, as in hæmoptysis, and the râle

resembles the sound of frothing of beer in a large glass. Leblanc has given it the name of the *spumous râle*.

THE DRY RALE is a sound extremely variable in its nature, being at one time engendered within the bronchi, at another, but the reverberation of a sound originating within the pulmonary tissue. It is comparable to a growling bass tone, mingled with deep supplementary respiration. This râle, always denotive of dryness of the bronchi, is especially manifested at the commencement of acute bronchitis: its duration is always very short. By some the *sibilous râle* is classed among bronchial sounds: in our opinion it more properly belongs to the pulmonary sounds.

BRONCHIAL RESPIRATION is the loud dry sound emitted by the air within the bronchial tubes at such times as some obstacle prevents its free passage into the air-cells. The sound resembles that produced by a rush of air through a tube of tolerable dimension, or the noise of sawing, or such as is occasioned by the rubbing of two planks of wood one against the other. The detection of this sound is easy, and at the same time of importance, from its being indicative of alterations, either in the lungs or pleura, tending to create obstruction in the vesicular tissue: there can be no doubt of its being occasioned by the rushing of the air in and out of the large bronchial tubes. It is less audible in expiration than in inspiration. In hepatisation of the pulmonary tissue the bronchial sound is heard along the line of demarcation between the hepatised part and that which is only yet infiltrated. It becomes augmented as hepatisation proceeds; diminished, with its absorption.

In effusion into the chest, it is as soon as the fluid has reached the height of the lower third of the cavity, and, consequently, as soon as the inferior border of the lung, from being inundated, becomes impervious to air, that bronchial respiration is discovered; and especially in pleuropneumonia, when the lung is hepatized and maintained in the fluid by false membranes, is the sound distinct. In the horse, both in recent and chronic effusions, the sound is ordinarily heard upon the same level at both sides; but in dogs and ruminants it is audible but on one side.

Acute pleurisy, at its commencement, is likewise characterised by bronchial respiration. In this case, it is synchronous with the small and short inspiration, and catching of the breath, owing to the sharp twitching pains the animal feels every time he dilates his chest; and it is accompanied with a general confused sort of noise which renders its detection extremely difficult.

PULMONARY EMPHYSEMA, in the latter stages, is also denoted by bronchial respiration, the murmur being hardly or not at all perceptible. Audible in inspiration, but more so in expiration, it has been divided into *ascending* and *descending* sounds. Almost always it is accompanied by both crepitous and sibilous râle.

IN CONCLUSION. Bronchial respiration being a constant unequivocal sign of important pathological alteration, it is that to which the practitioner should give his most special and undivided attention.

CREPITOUS RÂLE.—Laennec has given this appellation to a sound which accompanies the respiratory murmur, and which he has compared to the crackling powdered salt makes when thrown upon some burning hot body, to the noise elicited by the inflation of a small dry bladder, or to that produced by the compression between the fingers of a sound lung distended with air. It suffices to have heard it once not to confound it with the other râles; and, besides, this râle is audible in inspiration alone, which at once distinguishes it from bronchial respiration. The crepitous râle has two modifications, important to be distinguished: it may be *dry* or altogether like the crackling of the bladder, such as we have described, or such as is produced by the inflation and compression of the cellular membrane of horned cattle: this is called the *dry crepitous râle*, or crepitation. On occasions, however, the crepitous râle possesses a degree of softness or humidity which renders it comparable to the crackling of a bladder slightly moistened. This is less distinct than the former, and has received the name of the *humid crepitous râle*.

The **DRY CREPITOUS RÂLE**, or **CREPITATION**, is observable in interlobular emphysema of the lung, in partial gangrene—at least, in the parts surrounding the latter, and often in the extremities of the posterior lobes as well.

The **HUMID CREPITOUS RÂLE** is heard at the commencement of inflammation of the substance of the lungs. Should all murmur cease soon after, it is a sign of parenchymatous induration; its return indicates the resolution of the induration; and should murmur be heard around a part impenetrable to air, it denotes either resolution of the circumference of the indurated part, or that an areola of inflammation has been set up. In this last case the crepitous râle often continues; in the former one, it ceases. This râle is likewise manifest in intense bronchitis accompanied with some slight parenchymatous inflammation: we have often produced it also by injecting an irritating fluid into the bronchi. It is a common occurrence for this râle to be indistinct: when it is so, it becomes necessary only to momentarily excite the respiration to render it more audible. Should we be asked the question—How this râle is produced, and where? We answer—without entering into any minute and useless explications—that its source is the minute divisions of the bronchi and the air-cells; and that its occasion is, doubtless, the difficulty experienced by the air in making its way through these small tubes to the air-cells: added to which, it may in part arise from the distension of the cells.

DRY SIBILOUS RÂLE, or **SIBILATION**.—We have already observed, in speaking of the dry and mucous râles, that these sounds were the result either of the collision of the air with some obstacle in the bronchial tubes,

or of its rapid expulsion out of the air-cells. The sibilous râle issues from the bottom of the air-cells, and constitutes a shrill, dry, hissing sound, more or less prolonged and permanent. This râle is heard in pulmonary emphysema, both vesicular and interlobular, with dilatation of the extreme bronchi; and particularly during deep and distressful expiration. Its resonance through the bronchial tubes gives it strength and duration. At the entrance of the chest the râle is a grave sound; in the larynx and nasal cavities a shrill one; and in the open air is audible enough at a distance from the animal. Its intensity, doubtless, depends upon the extent of enlargement the bronchial tubes undergo. Many beginners in auscultation are apt, in large animals, to confound this râle with the nasal, laryngeal, or bronchial sibilation: careful exploration of the chest will prevent this mistake; inasmuch as the sound will always be found to be accompanied by the dry crepitous râle, bronchial respiration of a very loud character, and by catching of the breath.

CAVERNOUS RÂLE.—This râle, as is indicated by its name, can only proceed from some anormal cavity or *cavern*, within the substance of the lung, communicating with the bronchial tubes, and admitting air from them: this last condition being indispensable. Should the cavern contain any fluid, the air passing through it occasions gurgling or more or less ebullition, comparable to the noise produced by a current of air through a tube into a fluid in a vessel, from which it can only escape in part.

This gurgling, which itself constitutes the *cavernous râle*, is the more distinctly audible the more capacious the cavern is, and the nearer it is situated to the ribs. It is often accompanied by mucous and sibilous râles. When the fluid contained in the cavern comes to flow into the bronchi, and thence to be expelled by expectoration, the air, in passing into this cavity, ordinarily terminated by a cul-de-sac, should the cavity be near the ribs, gives to the ear an inordinately loud sound, called *cavernous respiration*. When the cavernous râle follows upon circumscribed absence of the respiratory murmur, it becomes the sign of distinction between the bronchial and parenchymatous structures under disease in that situation: this indication, in combination with such as are furnished by the discharges from the nose, and the air expired, may enable us to form some idea of the disease that has occasioned the cavern. One observation we would make here, to prove the importance of immediate auscultation, and that is, when the expired air is impregnated with the odour characteristic of gangrene, and the cavernous râle is distinct and circumscribed, we may affirm, during life, that such a lobe of the lungs is, in this part, the seat of an anormal cavity resulting from mortification. This râle is also one of the best indications we possess of morbid alterations in the lungs of our domestic animals.

PLEURAL SOUNDS.—When fluid becomes effused into the pleural sacs, we directly imagine that it will discover itself by a *rumbling*, or by *undula-*

tion during inspiration and expiration : observation, however, proves that this is not always the case—that in fact, these signs become manifest only in certain states, as will be seen hereafter. We find an exposition of these symptoms in a case of hydrothorax published by M. Massot, which he recovered by tapping. “When the ear is applied,” says he, “beneath the sternum, a dull, confused, drawling sound is heard, something similar to the noise made by rolling a cask containing liquid.” This observation is confirmed by M. Dandrieu, in a case of carditis, with water in the pericardium of a cow, narrated by him in the ‘*Recueil de Médecine Vétérinaire*,’ vol. iii, p. 488. “I applied,” observes M. Dandrieu, “my ear against the left side of the thorax, and I heard a slight confused noise, which I presumed to be caused by a fluid already partly effused into the cavity of the pleura, and, perhaps, even into the pericardium.” M. Leblanc seems to confirm both these accounts, when he says, in speaking of pleural sounds, that “at one time, kinds of rumbling (as of the bowels) are heard; at another, spumous sounds, if I may so express myself; at a third time, a gurgling sound: the first and last are ordinarily heard towards the lower part of the chest, supposing effusion to have taken place.

Experience has convinced me that the presence of fluid cannot with certainty be made out by these signs, except under two circumstances:—1st, when false membranes have been recently formed; 2dly, whenever gas becomes mingled with the fluid: whether it be generated by the fluid itself, be *exhaled by the pleura*, or get accidental admission into the cavity, the result is, that agitation produces froth; and then the spumous râle, combined with rumbling, becomes audible at the bottom of the thorax, and the less the quantity of fluid the louder the noise. Should there exist both fluid and false membranes, the sound becomes modified, approaching to rumbling, or rather to the gurgling of a bottle emptying itself while its neck is full, but much more feeble. This noise has always appeared to us to ensue whenever, with the effusion, there were present false membranes which had so formed or arranged themselves as to have small *areolæ*, or cavities of various capacities, into which the fluid entered during the act of respiration. In every case of hydrothorax without false membranes, and the presence of gas in the cavity, that has come under our observation, even when the like was produced by the injection of warm water into the chest, with the precaution to suffer the admission of as little air as possible, *we have on no occasion heard any sound produced by the fluid*. Moreover, it has long been an established fact in human medicine, that no sense of fluctuation, either by succussion or by auscultation, is detectable, except when gaseous fluid is mingled with the liquid effused: a case, be it remarked, extremely rare.

Such are the sounds afforded by the respiratory organs in horses: those of men furnish still more *on account of the voice*, which the surgeon having

the perfect command of, manages to render of the greatest service. The sounds denominated *bronchophony*, *egophony*, and *pectriloquy*, are all productions of the voice under various states of disease. In animals we lack this valuable aid.

We cannot conclude these observations on auscultation without remarking, in a general manner, that though of themselves of great importance, *they are not to be regarded as infallible* : they ought on all occasions to be coupled with the ordinary pathognomic symptoms ; and *by the two*, considered together and relatively, ought the practitioner to be guided.

We must make ourselves well acquainted with the permanent existence of the different *râles*. Some sounds will be found to come and go, and become replaced by others quite of another character ; or several sounds may exist at the same time. Notwithstanding all this, however, by patience, attention, and study, we shall be able, I think, to establish in our explorations of the chest, sure diagnostics of pulmonary diseases : our ear being previously well educated for the business. Practice will give us tact in auscultation, and perfection in the art will place us in a situation to estimate the advantages we possess over the person who refuses such aid.

DISEASE OF THE LUNGS.

Bronchial Disease of the Lungs, in young horses especially, is a frequent signal,—sometimes an accompaniment,—of catarrh and sore throat. The inflammation either extends from the nose to the throat, or seizes the latter at once, and from the membrane of the larynx descends along the windpipe upon the membrane of the bronchial tubes ; or else, as happens often, all parts become simultaneously attacked ; or even the inflammation may, by possibility, extend from the lungs upwards to the throat and nose. This is a form of disease very apt to become epidemic at the spring and fall of the year among young horses standing in stables, and often proves so general among them as to acquire the form of a contagious as well as an epidemic disease, and in that guise to obtain the name of *distemper* or *influenza* ; though, in reality, there is no sufficient evidence of the disease being other than bronchitis in a severe and complicated form, attacking horses at an age and under circumstances of peculiar excitability.

BRONCHITIS.

DERIVATION.—Bronchitis is derived from *Βρογχος* or *bronchus*, and *itis*, signifying inflammation of the bronchial tubes.

SYNONYM.—Coleman confounded this disease with “Inflammation of the Lungs.” Laennec has named it *pulmonary catarrh*, which, in point of fact, it is. In the epidemic form it is apt to assume, it sometimes acquires the name of *influenza* or *distemper*. In old works on farriery we find it described under the appellation of MOREFOUNDING, a word evidently introduced from the French *morfonderment*, or *morefondure*.

DEFINITION.—Discharge from the nose; cough; sore throat; with shortness of breath, and febrile irritation, sometimes without antecedent shivering.

BRONCHITIS SO VARIABLE IN CHARACTER rarely exists unmixed with other diseases, and this renders it less likely at all times to attract attention than it would otherwise do: it so commonly enters into the composition of affections regarded as entirely catarrhal or pulmonary that it is apt to be mistaken or overlooked. It will, insensibly almost, follow catarrh, and as stealthily, unless narrowly watched, run into pneumonia and pleurisy, and sometimes other thoracic diseases.

KINDS.—Bronchitis may be said to be *pure* or *mixed*, though the former is a character it rarely assumes, being mostly complicated either with catarrh (*catarrhal bronchitis*) with laryngitis, or with disease of the lungs. It may be *acute* or *sub-acute*, and now and then it will become *chronic*. In the spring and autumnal seasons of the year—among young horses especially—it is very apt to present itself, complicated with other disease, in the *epidemic* form, and then constitutes part—and perhaps the major part—of the disorder prevalent at the time under the appellation of *influenza* or *distemper*.

The CAUSES of catarrh are the causes of bronchitis. The same membrane pervades all the air-passages, and, though

from its situation within the lungs it is less exposed than within the head, still is it much under the influence of atmospheric changes and noxious inhalations. Independently, however, of these causes, there are others which in a peculiar degree operate upon the bronchial membrane. It is well known that this membrane, so vast in its superficial extent, is closely allied in its function of secretion with the skin; and not with the skin alone, but with other mucous membranes of the body as well, particularly with the one lining the alimentary canal. Cold or wet suddenly applied to the surface of the body, especially when heated, checking or suppressing perspiration, may, on the principle of derivation, throw an inflammation upon the bronchial membrane, or upon that of the bowels, and the two irritations, bronchitic and gastro-enteritic, may exist simultaneously. It is this known sympathy between these two membranes which deters us from giving aloes or anything likely to irritate the bowels in bronchitis; being in very great danger of becoming troubled with diarrhœa, if we do, at the same time. Bronchitis may proceed from other disease of lung or pleura, though its ordinary concomitant or precursor is catarrh and laryngitis. Now and then it supervenes on strangles.

CATARRHAL BRONCHITIS is the ordinary form the disease assumes. The horse is said to have "taken cold," and begins to show signs of catarrh; his prevalent symptom, perhaps but now commencing, being sore throat, proceeding from irritation of the membrane of the larynx and fauces, which speedily spreads down that of the windpipe into the larger bronchial tubes, and occasions, in addition to the sore throat, shortness and oppression of breathing. The discharge from the nose, which at first is but slight, and of aqueous or muco-watery description, in three or four days becomes of a purulent as well as mucous nature, and is greatly augmented in quantity: the symptoms of catarrh and laryngitis gradually abating and merging into that short and laborious breathing which clearly denotes high bronchial and pulmonary irritation. Whenever he coughs, which he does more now, matter is thrown out in increased quantity from the nose;

so that when the head is hung down, the discharge, when very great, will pour out from the air-passages. This is all very favorable, since such fluxes will carry off the impending inflammatory action. The worst turn an attack of bronchitis can take is the insidious one which commences with some irritation about the throat, accompanied with sore and oppressed cough, and, without occasioning much discharge, communicates itself to the substance of the lung, and, may be, pleural membrane as well, and so changes its character into either pneumonia or pleuro-pneumonia.

BRONCHITIS WILL BREAK OUT WITHOUT PRECURSORY CATARRH.—The horse will suddenly fall ill, be seized with violent blowing and distressful breathing, and all at once will emit copious outbreaks of mucous matters from his nose, from which he will at the moment, perhaps, obtain some relief; though they may, should they occur often, prove so dangerous as to produce suffocation even. Commonly, however, these sudden and violent attacks soften down into ordinary bronchitis; though at times they run the opposite way, and end in pulmonic disease.

EPIDEMIC OR INFLUENZAL BRONCHITIS is attended with exceeding sore throat and profuse discharges from the nose, at the same time the latter are modified and varied in their character, being sometimes white, sometimes yellow, and even at times green in colour, according to circumstances: the green tinge being given to it either through malignancy or while the horse is feeding on green-meat. The disease is so much more asthenic than sthenic as sometimes to be attended with great weakness of loin and prostration of strength, and with low febrile irritation: the blood evidently showing that the pulmonary changes requisite for its healthy conditions but imperfectly take place, seemingly owing to the obstructed condition of the smaller ramifications of the bronchial tubes.

The PATHOGNOMONIC SYMPTOMS of bronchitis are—inordinate nasal flux, with reddening of the Schneiderian membrane, cough, sore throat, dyspnœa. Auscultation will assist us in our diagnosis. In place of the natural, soft,

and all but inaudible *murmur*, we shall perceive a distinct sound, a cooing sort of noise, arising from want of secretion within the tubes. When the secretion returns, and in augmented quantity, we shall distinctly hear the *râle* or rattle as it is called. These sounds will, of course, be present only in places where the disease is present, and in one or both lungs, according as the case may happen to be.

PROGRESS.—The disease in its acute form attains its height commonly about the fourth or fifth day, and after the sixth or seventh begins to decline, leaving the patient out of danger at the expiration of the tenth or twelfth. Should the case not go on favorably, however, about the fifth or seventh or ninth day, when acute, we may look for decline into pulmonic or pleuro-pulmonic disease, if not, in consequence of suffocation, into death itself. The signs of growing worse are—the respiration becoming very oppressed; the pulse quicker and fainter; the skin and extremities cold; the mouth cold and clammy; and the nostrils dry, lacking any moisture whatever.

The PROGNOSIS is in general favorable. Bronchitis is dangerous only when the secretions clog or obstruct the tubes; or in its

COMPLICATED FORMS, as when combined with other disease of the lung, and with pleurisy. Especially dangerous is it when combined with disorder of the mucous lining of the alimentary canal. In this latter case, in combination with diarrhœa, and when the inflammation is running high in the bronchial membrane, there is hardly a chance of saving the animal.

PATHOLOGY.—In the advanced condition of veterinary science of the present day, bronchitis is no longer confounded with inflammation of the substance of the lungs: the structures are entirely different; the tissues in which the inflammation is seated so different that different effects are produced, and different terminations come to. The bronchi, like the windpipe and larynx, are lined by a secreting membrane which inflammation or irritation may simply augment the secretion of, or may run so high in as nearly or altogether to suppress it; and these changes of action

will have proportionate results in the animal economy. The inflammatory attacks of the lungs to which young horses are so especially obnoxious, are very often cases of bronchitis; and even of such as are peripneumonia, bronchitis is a common precedent or accompaniment. In fact, there exist very few diseases of lung in which bronchitis is not, in some degree, present, either in a primary or secondary form.

The TERMINATIONS or consequences of bronchitis are such as to make us anxious to institute such treatment at its commencement as is most likely to lead to their prevention; it being, of all others, the most fertile source of those organic changes which in particular tend to shorten or impair the animal's wind. Roaring and thick wind commonly have their foundation laid in bronchitis. The bronchial membrane during the early stages of disease will be found in a state of congestion or turgescence; in the sequel it is very likely to become thickened in substance—*hypertrophied*, as it is called—in which condition the calibre of the bronchial tubes, the small ones in particular, will suffer considerable diminution, and consequently become but comparatively imperfect conductors of the respired air. In the larger tubes the lining membrane is furnished with follicles, which impart to it the true mucous character; but in the very small ones, as we approach the air-cells, it has been found to bear more similarity to a serous membrane, and on this account becomes still more disposed to take on the plastic or adhesive kind of inflammation which not only gives rise to hypertrophy, but occasionally to solid effusion and agglutination of the sides of the tubes, obliterating their cavities, and converting them into mere chords, the same as happens when inflammation is set up in the interior of blood-vessels; and this may even go so far as to block up and annihilate the air-cells. The effect of this will be to shorten or “thicken” the wind, to compensate for which the animal will make additional efforts in respiration, and the result is likely to be *dilatation* of the vicinous tubes and air-cells. It would appear that this process commonly commences in the smaller and makes way into the larger tubes, and from the circumstance of secretion

having been found pent up in the air-cells while the tubes were in a state of obliteration, and assuming that sort of aspect which tubercles and vomicæ are known to give to the lungs, Mr. Stokes¹ has ingeniously suggested that this "will go far to clear up controversy about the nature and origin of tubercles." Horses that have died of acute attacks of bronchitis, young, and otherwise healthy, have exhibited nothing on dissection save a turgescent and thickened condition of the bronchial membrane, with the tubes so filled with frothy mucous secretions as to give rise to the belief that the animal had been actually choked by it, or, as Dr. Elliotson has significantly expressed it, "drowned inwardly by mucus."²

The TREATMENT of bronchitis must of course, in a disease so various and versatile, vary and even differ with the subject, the violence, and the stage of the malady we have to treat. There was a time when this disease, confounded with other affections of the lung under "Inflammation," would have shared the ordinary treatment of bloodletting and rowelling, &c. Since the distinction, however, between the membranous and the parenchymatous or vascular disease, as well as from experience, we have learnt that horses, young ones in particular, do best when submitted to a comparatively mild and soothing mode of treatment. The encouragement of the flux from the nose which Nature herself has set up as a sort of issue or outlet for the disease, must constitute a very important consideration. Conducting a stream of vapour from scalded bran, or hay, up the nasal passages by means of a sort of linen tubular conductor—when the passages are not too irritable to bear it—affords great relief: if the linen tube cannot be endured, perhaps the steam rising from an open tub or pail, containing the steaming material, may be borne; and while this is being done, by having a body of water in the tub over which the horse is holding his nose, the throat may be being fomented. No time ought to be lost in opening the bowels moderately, either by clyster, or the exhibition of an aperient, consisting of not more than two or

¹ In his 'Treatise on Diseases of the Chest.'

² Dr. Elliotson's 'Lectures.'

three drachms of aloes, using the latter in case the clysters, which may be repeated morning and evening if required, be not themselves sufficient. There will be no fear of super-purgation from so small a quantity of aloes; or, if there should appear to be, let water-gruel be substituted for the horse's water, and hay given to him to eat, without bran. A rowel had better be inserted early in the disease; over which, upon the breast, as well as upon the sides, may be well rubbed into the skin the turpentine liniment, recommended for the throat in catarrh (at page 22.) This liniment ought to be re-applied morning and evening until the skin evinces sweating and matting together from it; if continued beyond this the hair will come off. In the most severe cases, no hesitation should be made, or time lost, in applying potent and extensive blisters to the sides, previously either singed or clipped. The box or habitation of the patient ought to be kept at a temperature not lower than 50° Fah., and he should be warmly clad, and have his legs kept warm with flannel bandages. This determination of blood to the skin may be assisted by medicine. Either Nitric Æther draughts, consisting each of three or four ounces of æther to a pint of tepid water, may be given twice or thrice a day, or the fever ball may be administered morning and evening; the same as is recommended for catarrh (page 22). So long as fever and irritative action continue, great reliance must be placed on the continuance of the *soothing* treatment—steaming and fomentation; but when once the disease has fairly settled down in the chest, and appears to be running its course therein, threatening, to a certainty almost, communication to the substance of the lung, we must place more reliance upon counter-irritation and internal medicine than anything else. Even here—in young horses, certainly, and in old ones we are disposed to think so too—experience does not warrant the use of the phleam. While, instead of continuing the use of the fever medicine at this stage of disease, when effusion into the lung or cavity of the thorax may be apprehended, I have administered with the best effects alterative doses of mercury, in combination with diaphoretic

and diuretic medicine. | What I call the *Plummer's ball* (composed of—Hyd. Chlorid. gr. x; Ant. Oxy-Sulphuret. ʒj; Guaiac. ʒij; Far. Avenæ, ʒiij; Terebinth. Vulg. q. s. ut f. Bol.) will prove of the greatest service, not by only very gradually, in the course of time, affecting slightly the mouth, and so promoting absorption to a great degree; but, at the same time, by producing copious diuresis, and in that way carrying off that which might otherwise be deposited within the parts immediately diseased, or into the cavities.

PNEUMONIA.

By PNEUMONIA—from the Latin—we wish to be understood to express, either the condition of *congestion* or that of *inflammation* of the lungs.

PATHOLOGY.—The lungs being organs at once *sui generis* and extremely varied structure, will be found to be subject to diseases numerous as compared with those of other viscera, and more diversified in their character. The bronchial tubes constitute one division of their composition; the air-cells, in which the tubes terminate, another portion; their blood-vessels, a third division; the inter-connecting parenchymatous substance, a fourth; which four integral and principal fabrics are again distinct from the cellular and pleural membranes. Having already described one prevalent disease of the pulmonary system—*bronchitis*; we come to one exclusively belonging to the pulmonary organ itself—*pneumonia*; which will be found to differ from the former, in being less painful and irksome to the animal, in consequence of the tissue in which it is principally seated being known to be possessed, either in health or disease, but of comparatively little sensibility.

On this account, so obscure are often the symptoms of pneumonia, whenever the parenchyma is exclusively affected, or principally so, that it not unfrequently becomes an affair of doubt in the mind of the attendant practitioner whether the lungs be actually suffering from disease or not: hence such cases have obtained the appellation of the *insidious* or *obscure form* of pneumonia. Should the bronchi, however, parti-

icipate in the inflammation—which is more generally the case—then some such symptoms as characterise bronchitis will arise, and the seat of disease no longer remain questionable. Supposing inflammation to have attacked the parenchyma alone, the *bronchial* blood-vessels may be regarded as those principally carrying on the disease; but there may, and often does, take place prior to inflammation, and sometimes without any consecutive inflammation, and especially after over-exertion, a *congested* condition of the large blood-vessels (the pulmonary) of the lungs: a case of which kind will show other symptoms, and require a modified treatment, from one of actual inflammation.

DIVISION.—This difference in the pathology leads to the division of pneumonia into the *congestive* and *inflammatory* forms or stages. The latter admits of further division into *simple* and *complicated*, depending on the accompaniments—both of which are common—of bronchitis and pleurisy; the one case going by the name of *broncho-pneumonia*, the other by that of *pleuro-pneumonia*. A still further division of inflammatory pneumonia is required into *acute* and *sub-acute*; though these, of course, have reference but to *degrees* of intensity.

THE SYMPTOMS OF CONGESTIVE PNEUMONIA may supervene all at once, upon any act of sudden or violent exertion, or they may come on gradually. In the one case, the horse, in perfect health before, being put to some violent effort—whatever it may be, whether hunting, or racing, or over-fatigue of any kind—is now distressed for breath to that degree that it is evident, unless speedily relieved, he must die. In the worst cases of this description, the animal is all over in a tremor: a cold sweat bedews his body; there is no pulse to be felt; his extreme parts betray the coldness of death; his eye is frightfully wild with its pupil dilated, and, together with the boring of head and stupidity evinced by him, clearly denote the poor sufferer to be labouring under a species of delirium. Should this state of congestion come on in the stable, i.e. gradually, and some time after the cause is applied, the horse will shew it by at first appearing dull, and listless, and heavy-headed, and off his appetite; his respiration will

gradually become more disturbed and oppressed, partaking more of labour than of pain. The pulse will be full and quick, but probably so feeble as hardly to be perceptible. The ear applied to the chest detects no sound: the usual respiratory murmur is lost. The extremities—the legs and ears—have a cold, death-like feel; and in extreme cases the mouth is cold also, and the pupils more or less dilated. Cold sweats supervene; no pulse is to be felt; the animal gradually sinks, and in convulsions and delirium dies.

EARLY BLOODLETTING is the only remedy to save a horse in this state. The surcharged and distended pulmonary vessels must be relieved: the event will greatly depend upon the celerity with which this is done, and upon the extent to which we have been able to carry it. A large orifice must be made in the jugular vein; though from this the blood will seldom issue in any other than a tardy stream down the side of the neck, treacly in its consistence, and almost black in colour. So inanimate is a horse in this condition that it is as much as one man can do to support his heavy head, while another holds the blood-can to his neck. Blood must, notwithstanding, be drawn, until the patient shall begin to stagger from becoming faint: all hope of recovery being centred in this abstraction. Should he survive the paroxysm, the case will shortly resolve itself either into one of resolution and direct recovery, or into an attack of inflammation.

INFLAMMATORY PNEUMONIA may supervene upon the congestive, or it may come on by itself. In the latter case, it will commonly exhibit three stages or sets of symptoms; though the first stage may be, and often is, either absent or unnoticed.

The SYMPTOMS, in the first stage, will be such as are observed at the beginning of common fever and other inflammatory diseases: such as staring or erection of the coat, with cold extremities, followed, perhaps, by actual rigor; the horse “hangs his head” either in or under the manger, and has not eaten his last meal; has had for some days a short dry cough, which comes on when he is exercised, or after drinking; and is dull and dejected in countenance, and moves with great disinclination. To this succeed—fever, quickness of

pulse and heat of mouth, and injection of the membranes of the nose and eyes ; and now, in the second stage, the breathing becomes disturbed, and the case quickly develops itself. The nostrils will be seen opening and shutting their wings ; the flanks laboriously working up and down ; since the disturbed breathing will be of a kind to indicate embarrassment or oppression rather than quickness or pain : whereas, in subacute cases, the flanks can hardly be seen to move at all, and then it is that the *nostrils* become an important guide to us. The pulse, at the beginning, is accelerated, and commonly distinct ; but, as the disease proceeds, it is very apt to grow indistinct from fulness and oppression ; from which, however, it recovers by loss of blood, and then again becomes perceptible, and often, compared to what it was before, possessed of strength. The ears and legs are colder than ever. The membrane of the nose is moist and reddened, and there is often to be perceived a sparing, yellow, slimy issue from one or both nostrils. The horse stands constantly in the same place and posture, often with his fore legs stretched out, and prefers having his head directed either to the door or to any open window there may be. He never offers to lay down ; but from time to time casts a look backward at his heaving flank of a peculiar despondent character, which the experienced practitioner does not fail to recognise. The third and last stage is characterised by the respiration becoming quicker and more oppressed ; the pulse also quicker, but less distinct ; the coldness of the extremities continuing unrelieved ; the membrane of the nose changing from red to a leaden hue ; convulsive twitchings of the muscles of the surface ; extreme uneasiness ; lying down and rising again ; reeling in his gait ; haggard countenance ; delirium ; convulsions ; death.

AUSCULTATION, according to D'Arboval, detects a crepitating humid *r  le* around the inflamed places, with a louder respiratory murmur than in other parts ; whereas percussion indicates deadness of sound in the diseased parts, but resonance in others. There are cases, however, in which, from the inflammation being seated around the roots of the lungs, these tests are not present.

The MORBID APPEARANCES exhibited by the lungs in this stage are, an uniform arterial scarlet tint of the parenchyma, with a slight cast of yellow from the surface of any divided part; attributable to the exhalation of serosity into the interstices of the parenchyma, in particular around the borders of the inflamed places. The lung has lost its elasticity and crepitating property, and has increased in weight and density, but still swims in water. Its cut surface is frothy also. This accords with my own observation.

A horse came under my care for pneumonia on the 19th of March, in whom inflammation ran so high that several bloodlettings, &c. were required before it gave way. He was discharged "cured" on the 13th of the following month—April. A week afterwards, the same horse returned with a locked-jaw, of which he died on the third day from the attack. His lungs were now examined. On one side they were found quite sound. On the other, their substance was redder than natural, and there was slight interstitial effusion, augmenting their solidity, but not sufficiently so to sink them in water, or to warrant the application of the epithet "livery" or "hepatized" to them.

The PROGRESS of pneumonia will vary according to circumstances. Generally speaking, in a few days the disease will reach its height, and in a few days more evince indications either of gradually abating, and at length disappearing altogether, or of having set in to produce consequences likely to end in the destruction of life.

The FAVORABLE SIGNS are—abatement of the embarrassed and quickened respiration; comparative distinctness in the beats of the pulse; return of warmth to the extreme parts, moisture to the mouth, and secretion to the nose; swelling of the legs, which commonly commences in the hind ones; and sometimes of the sheath and breast (if the latter have been blistered or rowelled) as well; return of appetite; the coat becoming smooth and soft; rowel and blisters acting well, should either or both have been applied; the animal lying down and taking his rest.

UNFAVORABLY must be regarded symptoms the reverse

of these. The unabated continuance of the inflammation will be denoted by the unrelieved state of the respiration; by the continued frequency or indistinctness, or both, of the pulse; by the gloomy aspect of the case altogether. Should the breathing become on a sudden quickened and embarrassed; the pulse grow small and weak, and run up to a hundred or more; the legs remain cold; the mouth become cold; the eye acquire a peculiar desponding expression; the lower lip hang pendulous; the horse become uneasy; cast frequent and desponding looks at his flanks, and move from place to place, or lie down but rise again almost immediately, and begin perhaps to paw a little. Under such circumstances we may make up our mind that the scene before us will not hold out for long. In many cases of unrelieved pneumonia, particularly in the congestive form, the horse will maintain the standing posture up to the very last, and then suddenly drop down and die.

The TERMINATIONS of pneumonia, in the *congestive* form, are resolution, stagnation, and obstruction, followed by mortification. In the *inflammatory* form, the disease will end in reddening, more or less deep and patchy, of the lung, with effusion of bloody serous fluid into the parenchyma, and frothy matters into the air-tubes; or in consolidation and hepatization, succeeded by tuberculous formations and abscess, and ending in softening and degeneration.

STAGNATION OF BLOOD, consequent on the obstruction caused by the unrelieved distension of the blood-vessels, and their own inability to contract upon the column of blood, is the cause of death in such cases as succumb during the congestive stage of pneumonia. The accounts of horses dying in a few hours after attacks of what is miscalled "inflamed lungs," are cases of this character, and are not inflammatory in their nature. Their lungs are found gorged with blood, very dark-coloured, and, where congestion has existed for some days, really lax and rotten in their texture, and sometimes changed to that degree to be, in fact, gangrenous: hence the description given of them by farriers and grooms, and such people, as being "as black as their hats," and as

“rotten as a pear.” The obstructed circulation through the lungs will account for the disorder we find manifesting itself in the brain, particularly in the last stages of congestive pneumonia.

HEPATIZATION is the term we apply to the change the lungs undergo in consequence of inflammation, rendering their substance, when cut into, liver-like or *hepatic*: instead of presenting a pale pink, spongy, light, and elastic interior, we find them reddened, solidified, and become heavy and consistent; and, instead of floating in water, we find they sink.

M. Rigot has well portrayed this change. “The hepaticized lung appears to have, and on occasions really has, acquired increase of volume: its tissue is close; it crepitates no longer on pressure; on being cut, it does not present one uniform redness, but is irregularly shaded with rose, brown, and white tints, and at times with violet: these different colours, which give it a marbled aspect, are owing to portions of parenchyma remaining sound, mingled with blood, as well as to altered layers of cellular tissue. Cells are also to be perceived within the parenchyma occupied by the lobules of the lungs, which themselves appear converted into homogeneous amaranthine-coloured substances. Here and there, divided bronchial tubes, and large branches of veins and arteries, appear.”—“The impermeability of the lung prevents us from hearing the respiratory murmur, by causing a dulness of sound on percussion opposite the decayed parts, and this may happen at one single spot or in many places. A humid crepitous râle is heard around these places when they are in a state of inflammation. The respiratory murmur becomes louder in the sound parts than it was before; or in one entire lung, should the other be attacked by inflammation. The respiration becomes irregular and catching; the pulse tense, small, and wiry; the cough dry, though sometimes humid; the skin harsh. The horse does not lie down, or but for a short time, and upon the affected side.”

Should the symptoms continue beyond the sixth or seventh day without any decided change, either for better or

worse, we may consider the inflammation to have assumed the sub-acute or chronic form, and the duration and termination of the case to have now become extremely uncertain. The critical days, in pneumonic cases in general, have appeared to me to be the third, the seventh, and the eleventh days: beyond this last, little hope remains, without relapsed crisis, for a favorable termination.

DIAGNOSIS.—Pneumonia, in its true or inflammatory form, is very apt to be complicated with bronchitis and with pleurisy; though bronchitis may exist without the parenchyma being affected; and, but very rarely so, may, I believe, pleurisy. Bronchitis is characterised by the short, catching, painful breathing; by the frequent presence or precedence of sore throat and catarrhal symptoms, with concomitant irritation and soreness of the air-passages; while pneumonia is known to be absent by the sound condition of the lungs, as indicated by the respiratory murmur being everywhere audible. Moreover, in bronchitis, with the return of the secretion of the bronchi comes the mucous râle, and occasionally the sibilous râle. On the other hand, the characteristics of pneumonia are—absence of any symptom or direct manifestation of pain: the horse is spiritless, listless, gloomy; stands in one place and posture with his head dependent, and notices nothing; hardly condescending to raise it, though offered a handful of hay or corn, or perhaps he takes a mouthful, and retains it between his teeth without offering to masticate it, as though he had forgotten he had accepted it. Another marked symptom is, the death-like coldness and stiffness of the legs, and the difficulty there is in restoring warmth to them, and the still greater difficulty in retaining that warmth.

PROGNOSIS, commonly dated from one or other of the critical days, is marked by a general abatement of the symptoms of pain and danger, with some attempt at feeding, and, perhaps, a disposition to lie down; with an inclination to some other posture or place than the one originally taken up, and which is in fatal cases persevered in to the last. This standing-place will often be in one parti-

cular corner of his abode, most likely with his nose towards some window or doorway. As soon as change for the better is about taking place, his heels instead of his head may be found in such situations, clearly indicating that his respiration is becoming freer, and that some return of appetite is coming over him.

TREATMENT.—I will take it for granted that pneumonia, in its congestive form, has set in; which being the case, it becomes the imperative duty of the practitioner, without any regard whatever as to the state of the pulse or the condition of his patient, to abstract blood the moment he is called in. Generally speaking, a large orifice in the jugular vein is to be preferred to a small one: in cases of imminent danger it is absolutely indispensable. The quantity of blood to be abstracted must be as great as the patient will bear; our surest guide in this, as in most other cases, being the effect which the efflux of blood has upon the pulse at the jaw. While the blood is flowing, keep your fingers applied upon the submaxillary artery. So long as you feel the pulsation strengthening, so long may the stream of blood be continued; but the instant the vessel collapses under the pressure of the fingers, and pulsation seems sinking, let the blood-can be removed, and the vein pinned up. Although bloodletting appears not only admissible but advisable, and even absolutely indispensable, in *congestive* conditions of pneumonia, yet in *inflammatory* diseases of the lungs is the practice, pursued in the best hands, so far altered as to admit of such abstraction only in horses who are high in condition and in work, and of certain mature age. In young horses, and horses labouring under influenza of any kind, letting of blood is positively denounced as harmful. Indeed, some good practitioners carry matters farther than this, and peremptorily forbid bloodletting in *any form* of pulmonary or pleuritic disease; though, I should imagine, they must make exceptions where *congestion* is the state of disease. In the influenzal kinds of pneumonia, or any other form of epidemic disease, there is little doubt but that a good deal of harm has been perpetrated by letting out blood,

which, as it afterwards turned out, in the sequel and termination of the attack, to be so much stood in need of by the animal.

MEDICINE.—Some veterinary surgeons administer early in this disease, after they have bled, a *stimulant*; and though such measures as bleeding and stimulation would at first view appear irreconcilable, yet I am disposed to think, supposing the disease to be in the *congestive* stage, that the practice is a good one. After bloodletting has relieved the overcharged pulmonary vessels, a stimulant may prove serviceable, by adding to their power of contraction. The stimulant commonly exhibited, and perhaps the best, is nitrous æther. From two to four ounces may be given in a pint of warm beer or water. It is a good practice, early also, to rectify the bowels, emptying the posterior ones, either with a slight aperient (two or three drachms of purging mass), or effecting the same thing, in the preferable way, by enemata of soap and water. The medicine I have found of most service under a regular set-in pneumonia, has been the alterative ball as recommended for bronchitis, made after the manner of Plummer's pill, or Pil. Hydrarg. Chlorid. C., twice or thrice a day, until the mouth become affected. Providing the bowels be solid or "set" there is no fear of disturbing them with it. And this it is that inclines me more to rely upon clysters than to run any risk from an aperient; since it is through the set and undisturbed condition of the bowels that we are enabled to push the Plummer's pill, which often requires some days before we are able to perceive any benefit arising from it. In its operation, it seems to augment the secretions in general, acting as a powerful diuretic, and finally to produce that change in the system so conducive to the return of normal function, while it is casting out the diseased one.

COUNTER-IRRITATION is a valuable adjunct in the cure of pneumonia; though it be one from which we are not to expect much operation so long as the inflammatory action continues to run high: an impression must be made on the fever in the system before any blister or rowel or seton will

freely act. The best form of counter-irritation is *blister*: rowels and setons are of little comparative use in the *acute* stage of pneumonia. The preferable situation for the blister is the breast; for it will take effect on that *muscular* part when no impression can be made upon the tense skin and bony substance of the sides; and I hold it to be good practice to insert a rowel in the chest first, and afterwards rub the blister in over the surface of the rowel. Should the first blister take no effect, another may be applied at an interval of six hours, and repeated after a similar elapse, when the parts still prove obdurate; or, the part may be first scalded with hot water, and then the blister be applied. The sides likewise may now be blistered, they being closely trimmed or shorn by way of preparation. Or, a mustard embrocation may be used instead of the blister. The practice of keeping blisters open or discharging, is not one that answers with horses: it is better to wash off one blister as soon as it has ceased to work, and, after a short interval, should it be required, apply a fresh one.

STIMULATING THE LEGS is a practice I am not in the habit of pursuing myself: I prefer, when it can be done effectually, hand-rubbing them; for I fancy that the turpentine, which most of these leg-stimulants contain, is apt to engender annoyance and irritation in the system, and, although it certainly warms the legs, to prove a source of discomfort to the patient. Still, it is my duty to add, that very excellent practitioners make it a rule to stimulate the legs whenever they continue cold; and a favorite application of theirs for the purpose is the turpentine liniment, for which a recipe is given at page 21.

REGIMEN.—Whether we hand-rub or stimulate the legs, they, all four, ought, from the onset of the disorder, to be encased in long rolls of flannel or serge. At the same time clothes must be put upon our patient, sufficient to keep his body warm without proving burthensome to him, or, should it be in summer, without overheating him. It is also a good practice, should the patient be bled, immediately after bloodletting, to put on some additional clothes; since it so

frequently happens that a copious sweat follows the evacuation, the encouragement of which I often have thought has proved most beneficial to my patient. No habitation is equal to a "loose box" for him; and one facing the south or south-west is to be preferred to another having a contrary aspect. A dry and ample straw bed ought to cover its floor, and a pailful of cold spring water be hung up in one corner of it. Last, but not least, let the patient's shoes be taken off: his feet being freed from restraint will, doubtless, add to his comfort. As to food, none at this time will be taken, or even looked at, probably; neither is it proper that any, for the first few hours, should be offered.

Mr. Sibbald relates a case of pneumonia of great danger, in the pressing stage of which he employed the actual cautery, drawing lines, with his iron, over the surfaces of the entire chest. In less than twenty-four hours, he says, the disease had given way. The horse, however, was marked for life.

SUB-ACUTE PNEUMONIA.

The epithets, *sub-acute* and *chronic*, are here used to denote subdued or milder forms of pulmonary disease, sequelæ very often to the acute; though cases do occur, which from the first assume these mild and lingering forms. With the exception of such attacks of acute pneumonia as by bold and early treatment are at once arrested, and supplanted by the return of health, and of such as rapidly continue their destructive course in spite of every measure we may employ to counteract them, all cases may be said to decline into the sub-acute stage prior to their termination, whether that be in the return of health, perfect or imperfect, in pulmonary consumption, or in death: here the sub-acute is to be regarded but as a mitigated form of acute pneumonia. The rage of the inflammation is past; the horse is no longer in any immediate danger; he appears and is better; his breathing is less oppressed; his pulse is less quick and more distinct; the body and extreme parts have, perhaps, become warm, or they may continue cold;

appetite has in some measure returned: still the patient mopes about his box, and is frequently found standing with his head in one corner of it, instead of being towards his manger: moreover, neither his blisters nor rowels act kindly; and there is that expression of countenance and general aspect of him altogether, which impresses us with the firm belief that his disease is far from being removed, and that, without—and unfortunately but too often with—very narrow watching on our part, even now we shall lose him.

PATHOLOGY.—The subdued or sub-acute inflammation now besetting the lungs is, we learn from experience, of that kind which tends to alter structure, and lay the foundation for morbid growths such as are never afterwards removed. Now and then pulmonary consumption dates its offset from this stage of pneumonia. More frequently, the alterations in structure are limited to a more firm and complete hepatization, to obliteration of air-cells and bronchial tubes, and to a conversion of the red hepatization into what is called *the grey and white indurations*, of which Delafond has presented us with the following description:—

THE GREY INDURATION seems oftener to *succeed* to the *red induration* or hepatization than to be simultaneously present with it. The parts so affected assume a yellowish or greyish tint; they have acquired weight and consistence; their granules are smaller and closer together; their parenchyma is easily lacerated; sometimes compression converts it into a sort of jelly, from which may be drawn out cellular filaments, thickened and indurated: incisions through these masses often discover either a black blood, or a semi-fluid, inodorous, greyish or reddish matter.

THE WHITE INDURATION is the result of still more advanced disease. In this, granules are no longer perceptible; the indurated parts are exceeding dense, and altogether impermeable to air; when compressed between the fingers nothing is squeezed out but a little serosity, without their suffering much diminution. At first view, we are puzzled to explain this disorganization: we, however, by means of

analogous facts, shewing its progress from growth to development—although the observations have not been made on horses—are enabled to arrive at some explanation.

The primary seat of these alterations would appear to be the inter-lobular cellular tissue; but, whether from inflammation of that tissue, or from the effects of inflammation in the parenchyma of the lung, or in the pleura, is still matter of dispute between Dupuy and Delafond. Infiltration into this cellular tissue—at first of a serous, afterwards of a plastic nature—is evidently the forerunner of the change: the reabsorption of the effused fluid, as observed by Delafond, being slower within the cellular tissue than within the parenchyma, it follows that the fluid, become organically allied with the cellular membrane, may continue long after the cessation of the inflammation of the parenchyma, and form plastic layers, and kinds of partitions inclosing the pulmonary lobules. I have observed, adds he, these layers grown thick and indurated, surrounding abnormal productions developed in the very heart of the lung—tubercles, for example—to resist the disorganization of these morbid tissues, and still remain walls of cavities containing the mollified matter. Sometimes, in the same situations, we meet with disorganized masses of lung resulting from partial gangrene. These layers or partitions, while they continue to increase their dimensions, so compress the pulmonary tissue that they atrophize it, render it light-coloured, dense, and impermeable to air. According to Delafond, therefore, the white and grey indurations would be approaches to pulmonary atrophy: we, however, think that this holds true in regard only to the grey induration, and that in the white induration, properly so called, the parenchyma of the lung has completely disappeared, through absorption, and nothing remains save the cellular tissue indurated. Let us not forget to add, that the white induration is not constantly met with around tubercles; on the contrary, under many circumstances, the pulmonary tissue surrounding these crude heterologous masses presents simply a reddish areola.

Be these explications as they may—and, after all, they possess no real interest save as part of physiological pathology—Delafond considers the presence of grey induration to be indicated by the long standing of the disease; by entire absence of respiratory murmur, without crepitous râle; by deadness of sound; dry cough; emaciation; evanescent hot skin, and harshness and adherence of it to the subjacent parts. The extremities of the lobes of the lungs are often thus effected.

METASTASIS.—Now and then—not often—metastasis in the bowels will take place; though I do not remember to have had more than one case of this description. The most common, and I may add, the most favorable translation of disease we can have, is swelling of the legs, mostly all four of them, the fetlocks being the parts most affected. Sometimes the breast, with the belly and sheath, will fill as well; all which is favorable for our patient, since the pneumonia ordinarily from this time declines. Not so very infrequently it happens, after inflammation of the chest has continued for some time, and such a change in the symptoms has taken place as to give us hopes that our patient will recover, that, on the next visit we pay, we find him with his legs drawn together under his body, “all of a heap,” and unable to move. Too well does the experienced practitioner instantly recognise the cause of all this: he has succeeded in rebutting one enemy; he has now even a more formidable one still to contend with—viz., *fever in the feet*. To make use of the common expression on this occasion, “the fever or inflammation has fallen from the lungs into the feet.” Another part into which the inflammation may “fall,” even after the patient has been pronounced perfectly convalescent, is the fore fetlock-joints, or the flexor tendons and ligaments. I made mention of this in a case I sent to ‘THE VETERINARIAN’ in 1829; and the following year I had the satisfaction of seeing that the same had attracted the especial notice of my lamented friend, Mr. Castley, of the 12th Lancers. The attack is often so like a common “sprain of the back sinews,” that in any other case it would be

pronounced to be such; and the horse may limp quite as much, or even more. In some cases only one leg will experience this; but it more commonly happens, I think, that after an interval of some days—in one case it was seventeen days—the other fetlock becomes attacked. The swelling at first feels puffy, as though its contents were fluid; is exceeding tender to pressure, and is often situated to one side of the flexor tendons in the leg, from which, in two or three days, it drops down to the fetlock-joint, gradually losing its puffiness as well as its tenderness. Regarding it as a sort of rheumatic metastasis, I have fomented and used cold lotions and bandages for it, and, on some occasions, have practised local bloodletting—from the plate-vein—for it, and at the same time have exhibited gentle aperient medicine: I am not quite sure, however, that I have done any good by all this. A case has lately occurred to me in which during convalescence both *hocks* became swollen, tender on pressure, and warm to the hand, causing the horse to have a stiff straddling gait in his hind parts, evidently arising from a translation or fresh attack of inflammatory action upon ligamentous tissues. In one instance it ended in ankylosis.

IN THE TREATMENT OF SUB-ACUTE PNEUMONIA, although we may have got rid of the acute or dangerous symptoms, yet, even supposing the disease to have assumed this comparatively mild form from the beginning, are we not to imagine that in this mitigated condition it is harmless; so far from it, this is the form of all others in which inflammation, by continuance, brings about those alterations of structure—interstitial effusion, hepatization, induration, tuberculation—which are so much to be apprehended, not only from their indirect tendency to destroy life, but also, supposing they do not do this, from their rendering the lung more or less impermeable to air, and consequently so much the less perfect for the purposes of respiration, leaving the horse short or thick-winded, unthrifty, consumptive, valueless. The presence or continuance of inflammatory action is still to be met at every point, not with the same boldness of practice, but

with the same unremitting perseverance, until we are satisfied that what inflammatory or febrile action remains is but the decline of that which, from all appearances, is taking the turn to end either in the restoration of health, or some one or other of the terminations of inflammation. Venesection being, from prudential motives, withheld, the Plummer's ball will now become our great dependence, in combination with all the aid we can derive from the full employment of counter-irritation.

BLISTERS AND ROWELS AND SETONS are now especially useful. I would put a sharp and large blister upon the breast; or, a rowel may be inserted first, and a blister rubbed afterwards upon it. At this time also the sides may be blistered, or setons may be introduced into them. In my own practice, I depend most on blisters upon the breast, with the insertion of a rowel there; the sides being afterwards blistered: while, throughout the treatment, the ball must be continued thrice a day, or every eight hours, until either the mouth be affected or the symptoms sufficiently give way.

CHRONIC PNEUMONIA.

THIS is a kind or stage of disease in which, although fever may be, and commonly is demonstrably present, yet it is in that subdued or mild form which plainly foretels that the case is likely to prove one of considerable duration. There is no occasion for any immediate alarm about the life of the patient; and yet, since such important parts as the lungs are the seat of disease, though it be of a tardy and lingering nature, it may be difficult or impossible to say what may be the issue. Chronic pneumonia may have been the continuation of that which in the beginning was acute, and afterwards became sub-acute: or it may, and often does, have its own origin, run its own course, and terminate in its own peculiar modes, as though it were a disease *sui generis*.

THE SYMPTOMS are often of such mild and indefinite cha-

racter as to require on our part a great deal of search and inquiry into the case to make them out. The horse is evidently unwell, and yet, to common observation, no particular ailment is demonstrable. There may be no perceptible heaving of the flanks; but little quickness of pulse; no manifestation of pain; and yet the horse mopes about, dull and dejected; fastidious in his appetite; seldom or never lying down; looking unkind in his coat; and out of health altogether in his general appearance. Watch his nostrils: in some of these cases I have found disturbed respiration to be detectible in their movements when I could gain no information from the flanks. At the beginning we must inquire about cough, and examine the nostrils narrowly, to ascertain if there be any expectoration from them.

DIAGNOSIS.—Such symptoms as these will be sufficient to direct our attention to the chest as the seat of disease: now that we have percussion and auscultation, however, we need not stop inquiry here, but avail ourselves of their valuable aid to confirm our diagnosis, and afford us further information as to the particular seat and nature of the morbid action and alterations going on.

TERMINATIONS.—Chronic, the same as sub-acute inflammation, is to be viewed as a disorganising or destructive process, though it be of a tardy and tedious nature. It may end in hepatization or induration of the substance of the lungs: it is very apt, indeed, to run on to produce tubercles and vomicae, and in this form bring the case under the denomination of what is commonly called *phthisis*, or “pulmonary consumption.”

THE TREATMENT to be pursued in these obscure, latent, insidious chronic forms of pneumonia, is to be substantially the same as that recommended for the sub-acute stage; such points as there may be of difference will best come under consideration in treating our next subject, viz.—

PHTHISIS.

By *phthisis*—a Greek word, whose literal meaning is *corruption* or *extenuation*—is intended to be expressed the manifestation of certain constitutional changes, among the most remarkable of which is *emaciation of body*, consequent on the formation of tubercles and vomicæ within the substance of the lungs. It is a form of disease to which the horse is not obnoxious in an equal degree with man, inflammation in the animal's lung commonly assuming the acute character, and speedily ending either in destruction of life or in convalescence: whereas tubercles are for the most part the offspring of a tardy, latent, lingering form of inflammatory action, such as we have described under the epithet of "chronic." It is the opinion of some that the horse is not the subject of phthisis—not liable to such a disease. This question entirely depends for its solution on the views entertained of the nature of phthisis. If regarded as *scrofulous* in its origin, perhaps the horse is not its victim; but if as being a tuberculous disease, then is the horse's lung known to be too subject to tuberculous formations to resist the fact of his being, on occasions, the subject of pulmonary consumption. Still, there comes to notice the *kind* of tubercle necessary to constitute phthisis. Perhaps the *miliary* tubercle is the only one considered to be the genuine phthisical production. According to D'Arboval, horses and oxen afford more frequent examples of phthisis than sheep and dogs. And there are, he says, certain periods of life, in animals as well as in men, when the disease is more likely to make its appearance; which are, the several ages at which they arrive at the fourth, the third, and the half of the terms of their natural lives. Phthisis may be the sequel of pneumonia or pleuro-pneumonia, or even of some neglected catarrhal or bronchial affection: at other times it will come on of itself—as a disease *sui generis*—and insidiously steal on the constitution, making alarming advances before we become, perhaps, ap-

prised of its existence: old horses being the most frequent subjects of the former; young ones of the latter mode of attack. A young horse will undergo acute pneumonia or pleuro-pneumonia; and should he not sink in the congestive stage, or have his disease cut short by treatment, will die during the second or third or fourth week, with his chest full of water and intersected with albuminous effusions, and his lungs condensed and hepatized: but an old horse, with stamina to endure the conflict between disease and remedy, will hold out while tubercles and vomicæ are generating in his lungs, and, in the end, die of phthisis.

HEREDITARINESS AND PREDISPOSITION.—Is the *disease itself* hereditary?—or only the *predisposition to it*? Do tubercles, or the seeds or rudiments of tubercles, actually exist in the lungs at the time of birth? We seem to lack proof of this being the case; whereas we have had demonstration enough of horses “breeding the disease” in their constitutions. There are certain “makes” or forms of body, and there are also certain situations, in which the disease is most likely to be bred. The colt predisposed to phthisis is the one characterised by long legs and overgrowth; by narrow chest, and flat sides, and pot-belly; and altogether by an appearance of weakness and unthrivingness; to which D’Arboval adds, by more spirit and eagerness than is compatible with his physical development. In such a constitution as inhabits a body so constructed, we know, by experience, that pneumonia is apt to end in phthisis. Whether the tubercles exist prior to any attack of inflammation, or whether they form in consequence thereof, I will not here venture an opinion. There are two situations observed to be favorable to the generation of phthisis, which are certainly in their nature very opposite: one is, low, wet, cold, poor pastures, or other localities, where the animals are almost constantly respiring humid air, standing in wet, exposed to cold, and withal are half-starved; the other situation is, living in warm and foul stables, wherein the atmosphere is of that impure character which is known to be offensive to the membrane lining the air-passages. I

have on more than one occasion remarked, when my regiment has had a remount of young horses, and one of the lot—looking thin and rough in his coat, perhaps, when purchased—instead of improving in flesh and condition with the rest, has continued in his unthriving state, that, although perhaps for some length of time he manifested no illness, yet in the end he became phthisical. In this instance, one would feel disposed to think that tubercles must have pre-existed in the lungs, and that the supervention of inflammatory action induced phthisis. On the other hand, it is notorious that old horses in the cavalry—who have undergone many vicissitudes since their enlistment, and who, up to the period of their death, at an advanced age, have been known to enjoy the best of health—end their days either by consumption or by glanders: in both cases the lungs exhibiting tubercles and vomicæ. While the former fact, therefore, would lead us to regard tubercles as either an accompaniment or a formation, *sui generis*, in the young animal, the latter leaves us little reason to doubt that they become generated while inhabiting the stable.

THE SYMPTOMS OF PHTHISIS are numerous and liable to considerable variation. They may be conveniently considered under three stages:—

In the first stage—in the curable one, if it ever be cured—it is often extremely difficult to pronounce upon. A horse is shown to us for being out of condition, rough in his coat, hide-bound perhaps, and, for all the pains taken with him having failed in improving his condition. Moreover, he is foggy or weak at his work, sweats with but slight exertion; he is heard to cough occasionally after his water, or when first brought out of the stable, and is found short-winded. This suspicious state of body may have originated spontaneously and imperceptibly—may appear as if it had been bred in the animal's constitution, grown with his growth and increased with his strength; or it may prove the lurking sequel of some pectoral inflammation going before, and, perhaps, passed off; or it may, *longo intervallo*, follow strangles. The state itself is of most uncertain duration;

it may last weeks or months: it has been known in young animals to continue years.

During the second stage,—1, the case more or less develops itself. The respiration, though it may not be perceptibly disturbed at the flanks, will probably be found to be slightly disordered by narrowly observing the nostrils; and if they do not afford us the required information, our ear, applied to the breast or side, may. 2. By this, or with our hand, we may also discover tenderness about the sides. The pulse will be found quicker than it ought to be. 3. A short dry cough is heard now and then. The appetite is fastidious: at one time very good; at another, indifferent; never quite lost however. The spirits, like the appetite, vary: one day, cheerful; another day, depressed. 4. Sparing issue of yellow matter from his nose. 5. He loses flesh every day; his hip-bones begin to project, and his quarters to lose their plumpness; and his skin all begins to become tense and adherent upon his ribs.

The third stage not only dispels all doubt—should any remain—concerning the nature of the case, but too plainly discovers to the practitioner that he is treating a disease under which, in spite of all he can do, his patient must in the end succumb. It is marked by increased embarrassment in the respiration; by fetid breath and mouth and stinking discharges from the nose; by a highly quickened pulse; by troublesome cough, and the occasional coughing-up of the expectorated matters through the nose and mouth; by great emaciation and debility; by partial separation of the coat, so that when but slightly twitched the hair comes off; by dropsical swellings perhaps of the legs, sheath, and belly; by complete loss of appetite; by general irritability, and a truly distressing, haggard sort of expression of countenance; by an irritable state of the bowels and great proneness to diarrhœa, which, once excited, in this state of extreme debility, is likely to carry our patient off.

THE POST-MORTEM APPEARANCES, as well as the symptoms, are liable to a great deal of variation. In some cases, according to D'Arboval, the "lungs are found *perished* as it

were—shrunk and dry and hard and tough, and particularly towards their borders; in others, they assume a dull, tarnished, reddish-brown aspect, and are hepaticized.” These, however, ought not to be considered as examples of phthisis. “The development of *tubercle* in the lung,” says Laennec, “is, I think, the only kind of phthisis which we should admit;” and if we would avoid confusion of names and pathological differences, we cannot do better than subscribe to this demarcation.

THE DEVELOPMENT OF TUBERCLES in the lungs or other organs, occurs, according to Bayle and Laennec, under two principal forms:—that of *insulated bodies*, and of *interstitial injection* or *infiltration*. “Each of these presents several varieties, chiefly relative to the different degrees of development. The insulated tubercles present four chief varieties, which I shall denominate *miliary*, *crude*, *granular*, and *encysted*. The interstitial injection of tuberculous matter, or tuberculous infiltration, offers in like manner three varieties, which I term *the irregular*, *the grey*, and *the yellow*. Whatever may be the form under which the tuberculous matter is developed, it presents, at first, the appearance of a grey semi-transparent substance, which gradually becomes yellow, opaque, and very dense. Afterwards, it softens, and gradually acquires a fluidity nearly equal to that of pus: it being then expelled through the bronchi, cavities are left, vulgarly known by the name of *ulcers of the lungs*, but which I shall designate *tuberculous excavations*.”—*Laennec’s Treatise*.

BOTH OF THESE FORMS OF TUBERCLES are found in the lungs of horses. The miliary tubercles—which in their progress, by coalescence and conversion into one yellowish homogeneous mass, afterwards become the crude tubercle—are the kind commonly discovered in horses who die of phthisis: round or ovoid in figure, solid, firm, and uniform in substance, or exhibiting in their centres yellow or white spots, or else softened altogether in their consistence, according to the progress they may have made towards maturation. Now and then it happens, from coalescence

and simultaneous suppuration of masses of these tubercles, that large abscesses form within the lungs, and discharge their contents into some of the bronchial tubes, leaving cavities or caverns with irregular or anfractuous interiors, which Laennec has designated *tuberculous excavations*. More commonly, however, the tubercles suppurate individually, producing what are called *vomicæ*, that is, small abscesses in various parts of the lung. The other kind, the large yellow, or cream-coloured, or speckled, cheesy tubercle—that of Laennec's, resulting from infiltration—is also very often found in horses' lungs, and after pneumonia oftener than after phthisis; a circumstance which induces us to regard it as one of the remote consequences of inflammation: indeed, it appears ordinarily to supervene upon the morbid states of hepatization and induration; whereas, in the case of miliary tubercles, we are as often at a loss to account for their production as we are to ascertain their presence, it being well known that they may exist in a sort of dormant state in the lungs for years, without occasioning any disorder or apparent inconvenience to the animal. This need not excite surprise after perusing the following case:—

Mr. Hales, V.S., of Oswestry, was some years ago attending a cart-mare for a festered foot, and found it necessary to administer a second—she having already taken one—dose of physic. The day after this last dose, she died. She had not been dead above two hours when Mr. H., paying his usual visit, astonished at the event, was told in addition, and not very good-humouredly, that *his physic had killed her*. He inquired if it had purged her? The reply was, “No; it had not operated at all.” Mr. H. then very properly proceeded to examine the mare. “Her chest being opened, the mystery was unravelled. It was deluged with pus; and there were then in the lungs several large abscesses, one of which contained at least *a quart of pus*. The case was plain enough—a large abscess within the lungs had burst, and suffocated the mare.” “The gentleman to whom she belonged declared he always believed the mare to be as sound as any horse he had in his

possession. She ate her food to the last, and lay down very much to ease her painful foot.”—VETERINARIAN, vol. v, p. 264.

THE DETECTION OF TUBERCLES, while they are small and hard and unirritating, is what even percussion and auscultation fail in accomplishing: their existence can only be made out by these tests, and then but imperfectly, when they are numerous and large, and occupy a considerable portion of lung. The diminished murmur of that part, and its want of resonance on percussion, may induce us to suspect what is the case. Tubercles are most commonly found in the anterior and superior portions of the lungs. Suppuration and tubercular excavation will be announced by the cavernous râle prevailing. The absence of the fatty or *nutmeg* liver in phthisical horses, though so commonly seen in men, tends to the confirmation of the opinion of surgeons, that in the latter it is owing to habits of spirit-drinking.

TREATMENT.—Pulmonary consumption, once established, is a disease without remedy: at least, we know of nothing that has the power to rectify or remove those morbid changes of structure on which its confirmed existence depends. In colts already predisposed from their make to consumption, or in such as have contracted the predisposition from the situations they have inhabited or the vicissitudes they have been exposed to, and who, perhaps, have the seeds of consumption already sown in their lungs, we unquestionably possess some power of prevention, by attending to them in a manner and with a care which their peculiar case may appear to demand. We may go still farther than this, and say, that when inflammation or febrile action has to do with the setting-in of the disease, we have the power of suspension, if not of arrest, in our hands. As I have had occasion to observe before, inflammation ought never to be suffered to lurk or creep about the chest of a horse: it is a part so apt to take fire and burn with a smothered heat, that it requires, in every case to which suspicion of the sort attaches, the utmost and narrowest vigilance on the part of the practitioner. Let him who has a young horse out of

health look to his chest : other parts will commonly announce their ailments plainly enough.

PREVENTIVE TREATMENT consists in not only avoiding every bodily exertion, as well as any mode of living that may, by any possibility, be likely to give rise to inflammation in a chest ill-adapted to bear it, but in removing the animal from any situation in which he appears unhealthy into one of another description. During spring and summer, a run at grass often proves of the greatest benefit in giving a healthy turn to an ill-conditioned consumptive-looking colt: in cold and wet weather, on the contrary, the removal of such a colt into a loose shed or box, and there keeping him regularly, but moderately, fed and exercised, and well supplied with water, clothing, and cool air, would be most advisable. As to

MEDICAL TREATMENT, I know none that is or can be of service save what tends to check or subdue inflammation in the chest; nor can we expect much good from that but in such cases as are in their formative or incipient stages. We must narrowly watch the progress of catarrh and cough and strangles and bronchial affections in subjects such as I have described; and where there appears the slightest reason to believe that inflammation, in however mild or latent a form, has entered the chest, we must without hesitation attack it by medicine, and by counter-irritation. Set the bowels in order by enemata, or some very mild aperient medicine, and then commence giving the Plummer's balls twice or thrice a-day, and continue so as to slightly affect the mouth; or, short of this, to produce amendment enough for return, if possible, to condition and work.

Insert a rowel in the breast; and if more be thought necessary, blister that and the sides also. As soon as the animal appears convalescent—but not before we are quite assured that inflammatory action has subsided in his chest—should the season permit, give him a run at grass: if not, soil him in the stable. Indeed, that may beneficially be done while we are treating his disease, by giving green-meat when it can be got; otherwise, carrots, turnips, potatoes, &c.

PLEURISY.

By *pleuritis*, or pleurisy, is commonly understood inflammation of the pleura without inflammation of the lung: when both pleura and lung are involved in the inflammation, we denominate the case *pleuro-pneumonia*. At the time that I was a pupil at the Veterinary College these three diseases, or forms of disease, were included under the phrase "inflammation of the lungs." The lungs were supposed in all such cases to be the seat of disease; whether the pleura participated or not in the inflammation being never inquired into until after death. The French veterinarians were the first to call our attention to the distinctness of these diseases, and to instruct us how in practice we were to know one from the other; and in our own country no veterinarian took more pains to learn and demonstrate this difference than my ever-to-be-lamented friend, Mr. John Field.¹ Whether, in strict accordance with pathological definition, inflammation is ever fully developed in the pleura without extending to the lung, or *vice versâ*, is not a question I shall trouble myself to solve: all that it being necessary for us to know, in my opinion, is the fact, that, when inflammation is invading these parts, it is sufficiently predominant in one to induce us to regard that as the *main* or *principal* seat of disease, and to treat the case in accordance with such views; and that disease is rarely or never so uniform in its attack of the two parts as to lead us to believe that one is quite as much the object of care as the other. There are cases in abundance of pleuro-pneumonia, greatly more than of any other description: still, I contend, that, in almost all of them, we shall find either the lungs or the pleura to be the part primarily and principally affected; and as such, as I before observed, to be the especial object of treatment.

"Is pleurisy really a less frequent disease than pneumonia?"

¹ Mr. Field read a paper on the subject to the Veterinary Society, which was afterwards published in the second vol. of the '*Veterinarian*.'

as Delafond affirms," asks D'Arboval : "we dare not assert so much. What renders it so much to be dreaded, is the fact of its so often spreading to the lungs, when, indeed, there is too much chance of its proving mortal ; at least, cases of complete recovery are then very few indeed."

THE ORDINARY TENDENCY of an attack of pleurisy is the augmentation and accumulation of its natural serous or watery secretion, with or without the accompaniment of effusion of solid lymph or albuminous material. This is, moreover, particularly to be looked for when the disease, acute at the beginning, has moderated down in its violence, and especially is to be expected in the sub-acute and chronic stage of the disease. Both in the acute and chronic stages we may have suppuration ; while in the former, when very violent and quickly fatal, we may have once or twice found the membrane in a gangrenous condition. When pus is poured out, the matter is commonly seen in flaky masses adhering to the surface of the membrane, or else floating about in the effused water. Cases have occurred in which it has collected and formed abscess in the side of the thorax.

GANGRENE, though very rarely, is now and then occurring as a termination of pleurisy. The cases I have met with have been remarkable for intensity of inflammation and severity of suffering. I will relate one.

In 1830, a four-year-old horse was discovered at seven o'clock in the morning, in his stable, sweating profusely ; heaving hard and quick at the flanks, and puffing at an equal rate at the nostrils ; pulse but very indistinctly to be felt ; mouth hot and clammy ; legs intensely cold ; head hanging down, and countenance betraying serious illness ; eyes and nose reddened, the latter moist with yellowish sanious matter ; breath fetid, as well as mouth. When pressed upon the side, he flinched and turned his head, and evinced much soreness.

As soon as he was got dry and warm from the cold sweat he was in, he was bled ; scarcely, however, had two quarts of dark thick blood flowed before he began to reel.

The treatment afterwards was such as is ordinarily pursued ; but to no purpose. The pain he manifested was extreme. He would rub his nose against the rail across the door-way of the box, thrust his lips violently against it, and sink his eyes with suffering. He was twice seen to lay down, but immediately rose again. Towards the conclusion, a bloody issue appeared at the nose. Before death he became delirious, and expired in dreadful agony. Water within both sides of the chest—from six to eight quarts. Pleura intensely inflamed : costal portion every where most minutely and thickly injected ; pulmonary portion likewise injected, but it had also become gangrenous—it exhibited a *green hue*. Lungs partially tuberculated ; otherwise, and particularly in their interior, they were sound.

THE KINDS or forms of pleurisy are two—acute and chronic : one may follow the other ; or the chronic kind, as well as the acute, may exist by itself. Although consisting, as far as we know, both in inflammation, they appear quite opposite diseases : one is full of activity and expressions of pain and irritation ; the other comparatively painless, tardy in its progress, and apt to continue many weeks before it comes to any issue.

THE MOST LIKELY SUBJECTS for pleurisy are horses four and five years old, about completing their growth, and entering into the adult period of their lives, inhabiting warm stables, and living high.

CAUSES.—Any sudden or extra exertion, any exposure to cold, immersion in cold water of the legs or body while the skin is heated, or even a large draught of cold water at such a time, may be followed by an attack of pleurisy. Injury to the membrane, such as a broken rib, or a severe blow or fall upon the side, might be productive of a pleurisy ; but this occurrence is rather unlikely to happen. By chemical stimulating matters introduced into the cavity of the chest, pleurisy has been artificially excited.

THE ATTACK OF ACUTE PLEURISY may be sudden ; or there may be some previous indisposition, in which incipient form it may be confounded with pneumonia or even

bronchitis; though as soon as the inflammation has fairly set in,

THE SYMPTOMS commonly prove such as will dispel any doubts we may entertain of its similitude. The horse will begin by evincing uneasiness, and that will gradually increase until he come to manifest acute and poignant pain. And now he will heave, or rather pant, violently at his flanks, puffing and blowing in the same painful and distressing manner from his dilated nostrils, while occasionally he casts most piteous looks back at his flank, as if entreating the bystander to relieve him of the agony he is enduring. He is hot all over his body—actually in parts sweating with pain; and is in such a state of nervous irritation that he cannot be easy for a minute even; but is looking first one way, then the other, and every now and then pawing with his fore feet, or else laying down for a moment, to try if that posture will give him ease; but finding none, he is up again almost as soon as down. Pressure against the intercostal spaces occasions flinching and shrinking, and commonly elicits a characteristic *grunt*, with offers to bite. Often a cough is present, and this so annoys him by the pain it occasions that he, in efforts to suppress it, makes a sort of reiterated hacking or half-cough of it. The pulse is very quick, and has a firm wiry feel. The mouth is hot and dry. The pituitary membrane is reddened and humid; but there is no perceptible defluxion, unless some catarrhal or bronchitic irritation be present as well.

UNDER THE SUB-ACUTE OR EVEN CHRONIC FORM, pleurisy is quite different in its manifestations. Although we find, *post-mortem*, often almost equal intensity of inflammation in the membrane, we have during life no such violent and distressing symptoms as are indicated in the acute form. But, on the contrary, we have even dulness and dejection continuing from first to last. Even the respiration does not signify any or much embarrassment until shortly before death, when all the time the thorax is nearly or quite full of water. In fact, the only symptoms indicative of such being chronic pleurisy, is the tenderness evinced by pressure

on or pinching of the sides, the pathognomonic grunt, and the continuance of the respiratory murmur. This form of pleurisy I have found to be the one which ordinarily follows—when pleurisy does prove such a sequel—catarrhal, laryngeal, or bronchitic disease, in the epidemic form, *alias* that of influenza. Should there be the continuance of cough, it now becomes faint and sore, and now and then gives rise to the afore-mentioned symptomatic grunt.

AUSCULTATION detects the respiratory murmur, though not so distinctly as in health; while *percussion*, which evinces the characteristic soreness of the sides, yields distinct resonance.

The PROGRESS of acute pleurisy is rapid. Should no change take place within twenty-four hours after the disease appears at its height, we may rest assured another day cannot pass without the issue of the case becoming manifest, either in subsidence of the fury of the symptoms, or in such alteration of them as to render it but too evident that—what we have most to dread, namely—effusion, is going on.

The RETURN OF HEALTH is often as rapid and unexpected as the attack was sudden and unlooked for. We are called to our patient, distressed to the last degree by his complaint; we take a quantity of blood from him, and in a few hours afterwards we find him to appearance recovered.

The DIAGNOSTIC or distinguishing characters of pleurisy, are—1st, The general manifestation of acute, poignant pain. (Dr. Elliotson represents the pain in a pleuritic man to be “acute and stabbing.”) 2dly, The particular or local manifestation of pain in one or both sides, when firmly pressed against, with the elicitation of the peculiar grunt. 3dly, The respiration, which is short, catching, painful, and puffy. 4thly, The breath, not feeling hot to the face or hand, presented to the nostrils of the patient. 5thly, The pulse, whose beat is quick, firm and wiry. 6thly, The cough, so frequent an attendant, which is hacking, reiterated, cut in two, as it were. 7thly, The symptoms of colic, which are often present. 8thly, and particularly in the advanced stages of the disease, percussion and auscultation.

Notwithstanding these tests, however, cases of pleurisy in a sub-acute form occur in which the diagnosis even in the primary stage is obscure.

Our PROGNOSIS in pleurisy must be guarded, it being a disease of highly dangerous tendency. If, however, we are called early to the patient, and succeed in abstracting a quantity of blood, we shall have a good chance of arresting the inflammation. Should it proceed in spite of blood-letting, though with diminished violence, there will still be great reason to dread some sinister result. Now and then, the disease hurries off the patient in the course of a few hours, in opposition to all remedial measures.

The TERMINATIONS of pleurisy are four,—*resolution, effusion, suppuration, gangrene*. That in resolution has already been disposed of: we will now consider

EFFUSION.—It is of two kinds,—*water* and *lymph*: the one being technically known under the appellation of *hydrothorax*, or water in the chest; the other, by that of *albuminous effusion, adhesions, or false membranes*. Although these effusions may exist independently, they far more frequently co-exist. When a horse dies from a pleurisy which has lasted any length of time, we expect to—and commonly do—find that appearance in the chest which an old veterinary friend of mine was wont aptly to depict by saying, “the cavity of the chest was hung with shreds of lymph, after the fashion of a *cobweb*.” and the comparison is by no means an unhappy one. These subjects will be continued under the headings—HYDROTHORAX and ADHESION.

PLEURISY RARELY CONFINED TO ONE SIDE.—We know this from practice; though experiment—as will be hereafter shown—proves that it is from *sympathy* often that the other side takes the disease.

The TREATMENT of pleurisy may be said to be comprised in the regimen and remedies which have been recommended to be adopted in pneumonia: there are, however, some points of difference in the application of such treatment, to which we would proceed to direct attention.

BLOODLETTING, I would set the same restrictions on,

as I have deemed it prudent to make in pneumonia. Young horses, and horses having pleurisy as the accompaniment or sequence of any epidemic or influenza, will not bear abstraction of blood, for the reasons which have already been urged in pneumonia. At the same time, I do not think we ought to withhold the phleam in cases of pleurisy occurring in horses in mature age, who are in work and condition, and whose powers are plethoric; though even here our practice has undergone a change tending very much to lower our estimate of the extent to which such abstraction ought to be carried. It should not be pushed to anything like the extremity it was wont in former days to be carried. Medicine and counter-irritation must be more relied upon. If I could abstract blood through local or topical means, I am not sure I should employ general abstraction at all. Surgeons have leeches at hand to apply; and we might shave the sides, and put on leeches too; but from the number we should require, and the cost incumbent, I fear the practice would not be found maintainable. There are also sufficient objections to any attempts at cupping the sides. By way of substitute for these objectionable and impracticable modes of drawing blood locally, D'Arboval speaks, with all the confidence of one who has frequently practised it, of the following method of obtaining blood from the chest:—"Let the inferior parts of the sides be shorn, and rubbed with hot vinegar until rubefaction be produced; then let hot mustard poultices be applied upon them, and kept on for two hours, or until such time as engorgement shall have taken place, which is to be scarified, and thus as much blood obtained as may be required. After the bleeding, the sides are to be covered again with mustard poultices. This local bloodletting may be repeated as often as is deemed necessary—four or five times within the space of twenty-four hours. Fomenting or steaming the sides with hot water will greatly increase the emission of blood; and a hot cataplasm will be found to give much relief whenever the pain is confined to any one spot." How far this French mode of procedure may be effectual or advisable, from

never having tried it myself, I cannot pretend to give an opinion. I think it, however, in desperate cases well worth a trial.

THE MEDICINE we must rely upon is *mercury*; and the form in which I give it, and continue it until the mouth is made tender or the breath affected by it, is described under bronchitis and pneumonia. I prefer the Plummer's pill or ball to any other preparation, because there is reason to think it may act on the skin, whilst its diuretic action is great and manifest, and its salivative tendency, acting on another order of parts, is undoubted; nor have I ever had any reason to apprehend diarrhoea or purgation from its use.¹

COUNTER-IRRITATION is, in the disease before us, a measure of great import. Its *early* and *effectual* administration is of the greatest consequence. In the height of inflammation, mustard plasters to the sides, repeated if they do not take effect, are highly recommendable. They act quicker and surer, and more sharply than blisters. At the same time, the breast may be rowelled, and blistered over the rowel. The mustard plasters will in some cases produce painful and copious perspirations, which will indicate the necessity of sponging them off with warm water, and clothing the horse afterwards well to encourage the diaphoresis: an operation, though annoying and painful at the time, which oftentimes much relieves the patient. With a view of arriving at the same end by different means, Mr. Field has for some years past been in the habit of practising DRY CUPPING in pleurisy. His cups are made of brass, are of the ordinary shape of the glass cups, and about the size—though in this respect they vary some little—of a common tumbler. Their application, which is effected by means of rather a large spirit-lamp, is the same as in human practice; only the animal requires being watchfully held, bridled by the head, lest he should spring up or fall and hurt himself, which is very apt to occur at the moment the cup seizes hold of the skin. In some cases, so many as

¹ An excellent mode of introducing mercury rapidly into the system is to place five grains of calomel upon the horse's tongue every hour.

twelve cups are applied upon the side at once. On no occasion are cups placed upon both sides at the same time. Before they are applied the coat is thickly greased with hog's lard. Ordinarily, the cups are kept on for about half an hour, in the course of which time it often happens that the animal manifests considerable uneasiness, and at length breaks out into a profuse sweat, seemingly from irritation. Mr. F. says, the relief obtained is in most cases too manifest to admit of question. Circular elevations, from effusion, remain in the skin for some time after their application; and when these have subsided, indented rings are still left where the cups have pressed; but they do not occasion any destruction of the coat unless the cups be kept on too long. In dangerous cases, three or four applications of them may be required in the course of twenty-four hours.

Mr. Simpson, V.S. Southampton, has, at the suggestion of Mr. Chapman, been in the habit of employing as an application to the sides or breast, even in preference to blisters, in cases of pleurisy, two drachms of tartarised antimony dissolved in two ounces of oil of turpentine. By repeating it, he finds he can produce with it "decided effect, even after blisters have totally failed."

EFFUSION.

Should our patient survive the fury of the first attack, and the inflammation so far abate as to come under the denomination of *sub-acute*, our apprehensions, though allayed on the score of immediate destruction, still remain so long as inflammatory action is going on, impressed as our minds are with the fact of there being but too much reason to dread that, after all, the case will end in effusion. This, as I stated before, is of two kinds,—*water* and *lymph*; and these, as I also observed, may exist either in combination or separately: most commonly they co-exist.

The WATER resulting from acute pleurisy is, in most cases, a beautifully clear, limpid, bright-yellow fluid, closely resembling the serum of the blood, though in some cases it

is rendered turbid by the lymph floating in it; while in others, it is red from being tinged with blood; and I have seen it of a sort of milky or whey colour, from the commixture of purulent matter (likewise discharged from the surface of the membrane) which will also occasionally communicate a bad odour to it. In many cases in which lymph or fibrinous matters are found mingled with it, the fluid is of that albuminous character that, on being set by to cool, it will in a short time coagulate. Its quantity will vary in different cases from a few pints to several gallons. Commonly, some is found in both sides of the chest; now and then, however, it is effused but on one side. In general, the fluid being unconfined, gravitates to those parts of the cavity which are lowermost, such being the sternal or the costal region of the thorax, according as the animal happens to be in a standing or a lying posture. I have, however, seen the fluid, or part of it, walled in by the effused lymph so completely that, like the pus within an abscess, it was confined to one place. We will prosecute this subject when we come to Hydrothorax.

The LYMPH, when first effused, consists of masses of gelatinous or albuminous matter, impregnated with serous fluid, variously disposed; sometimes in bands or filaments athwart the cavity, from the lungs to the ribs, intersecting or partitioning the interval into several most irregular compartments, the whole, in its apparently deranged or fortuitous condition, resembling nothing so much as the hanging of cobwebs; at other times, in sorts of granulated or filamentous tunics, clothing both surfaces of the lung, and forming an entire interior lining to the cavity, and in many cases coating the exterior of the pericardium as well, such layers or coatings being what we are to understand by the appellation, *false membranes*. In addition to this are often to be perceived masses and flocks or strings of lymph floating about in the water, or from their weight gravitating to the bottom of the cavity. I believe this fresh lymph may become re-absorbed. In general, however, it remains, and acquires increased consistence, and undergoes a gradual process

towards organization. According to D'Arboval, "sorts of insulated portions of blood first make their appearance here and there within it, in which are discoverable little straight or flexuous canals, also filled with blood, terminating in culs-de-sac, and having no communication with the vessels of the pleura; from which, indeed, they are separated by a layer of lymph. In a more advanced stage is to be observed cellulo-fibrous layers, more or less dense, intersected through their most consistent parts by a variable number of parallel, rectilinear, and extremely slender vessels. At length the time arrives for these vessels to unite with those of the pleura, and from that hour the false membrane constitutes a part of the integral structure."

IN WHAT SPACE OF TIME MAY, OR ORDINARILY DOES, EFFUSION TAKE PLACE?—This is a question of vast importance to the veterinarian. Disputes and horse-causes are so apt to arise out of horses dying of pleurisy or pleuro-pneumonia, wherein we are liable to be called upon for opinions, which, if not received as decisive, must on all occasions be supposed to have considerable influence in the decision, that it becomes in us a bounden duty to make ourselves complete masters of the subject in all its various relations. We are requested to inspect the body of a dead horse—whom we may have seen during life, or may not—and we are summoned before a jury to give evidence on oath concerning the period of time such morbid alterations as may be presented to us would take in forming; or, in other words, to say from what antecedent date the commencement of the horse's disease is to be computed. This of all others is, perhaps, a situation the most trying, the most responsible, the most fearful, in which a veterinary surgeon can be placed.

Referring to my own practice and personal observation, I find, that, in one horse who died of a pleuritic attack in seventeen hours after he was seized, there were recent adhesions formed between the lungs and sides. In another case it appeared sufficiently evident that three gallons of water had become effused into the chest within three days. From numerous experiments, however, which have been

made in elucidation of this subject by the French veterinarians, Dupuy, Dolafond, and Hamont, we are enabled to speak with still more confidence and certainty.

DUPUY injected into the right cavity of the chest, between the eleventh and twelfth ribs, two drachms of oxalic acid dissolved in three ounces of water. Shortly afterwards, the animal commenced pawing with his fore feet, looking at his flank, which had become in a sweat, lying down and rising again almost immediately. The respiration and pulse became quickened, the temperature of the skin augmented, and the pulsations of the heart accompanied by a remarkable sound. On applying the ear to the side and upon the windpipe, a sound was heard similar to what rubbing dry parchment together would produce, and besides, the sound of fluid within, particularly on the right side. The next day the sound of fluid had become still more distinct, and yet the animal appeared better and commenced feeding; the third, the pulse and respiration were more frequent, the latter also short and embarrassed, and threatening suffocation. On the fourth day the pulse became intermittent, as well as the pulsations of the heart, which were now more distinct on the right than on the left side. Fifth day, pulse feeble and intermittent, respiration impeded, pituitary and conjunctive membranes violet-coloured, skin bedewed with cold sweat. The breathing gradually became more embarrassed, and the animal, growing weaker and weaker, died without a struggle. Pleura of the left (right?) side covered with false membrane, yellow, consistent, and several lines in thickness; about ten *litres*¹ of grey serosity within the cavity, floating in which were flocks of lymph; pericardium covered with false membrane, and containing several *litres*¹ of bloody serosity.

This experiment, several times repeated, constantly offered the same results. Among others, one horse, destroyed fifty hours after having been injected, contained twenty-five *litres* of citrine serosity, with yellow, thick, false membrane enveloping the costal and pulmonary pleuræ.

¹ The French *litre* is rather more than $1\frac{3}{4}$ of an English pint.

These prove that effusion, both of lymph and water, may take place in a few days, and that they are not, as was formerly believed, the effect solely of chronic inflammation.

HAMONT obtained precisely the same results from a horse into whose left pleural sac he injected seven ounces of a weak solution of tartaric acid, and the next morning repeated this injection, and then, twenty minutes afterwards, destroyed him, while he was in a state of tremor and agitation of breathing. Opened immediately, in the left side was found some of a citrine liquid; pleura injected and reddened; diaphragm and pericardium covered with a thin layer of soft lymph; lungs pallid and collapsed. On the right side the pleura was transparent without any injection of its vessels.

DELAFOND'S experiments, twenty-two in number, lead us to the same conclusion, although they were instituted with other views, viz., for the purpose of ascertaining the pathognomonic characters of pleurisy. They have shown that the commencement of pleurisy is the period most difficult of recognition; that the signs furnished by effusion were most to be depended upon; that in the horse, on account of the texture of the mediastinum, no certainty could be arrived at concerning right and left pleurisies; but that, in the dog, it is still possible to maintain such distinction, the mediastinum of that animal offering sufficient resistance in some cases to confine the fluid within the cavity into which it is effused. Even in this subject, however, such does not always happen.

The PLEURA BECOMES ALTERED IN TEXTURE in chronic or relapsed cases of pleurisy. It gets thickened, indurated; grows tough, and apparently less vascular, and assumes a morbidly white aspect. In other cases I have seen it studded with little knots, like tubercles.

The SEROUS MEMBRANES in the horse are exceeding apt to fall into a morbid or disordered condition simultaneously; rather, I should say, through some peculiar diathesis of body than by sympathy; though I have no doubt there are cases in which the latter has considerable influence. This

accounts for our meeting with water in the chest, pericardium, and abdomen—and head too, perhaps—in the same subject; of which there are many cases on record. It likewise furnishes a reason for unsuccessfulness from the operation of *paracentesis*.

PLEURO-PNEUMONIA.

Pleuro-pneumonia and *pneumo-pleurisy* are the names given to that extended inflammation which involves both lung and pleura; the one or the other of them being considered the more appropriate according to the part in which the disease predominates. I have before stated that the majority of cases of what, in common language, are called “inflammation of the lungs” belong to this compound class; an observation in accordance with that, I believe, of our best veterinarians. A French writer, Delafond, denies this, and by way of proofs brings forward fifty-five cases of horses that have died of disease of the chest, out of which twenty-seven were pneumonia, fifteen pleurisy, and but eight pleuro-pneumonia. However, he has very properly qualified his observation by remarking, that locality, constitution, and certain unknown agents—such as produce epidemics—may have considerable influence. Although I do not assent to Delafond’s computation, yet his remarks must be admitted judicious, and his inferences sound:—“If experience,” says he, “has proved that, *cæteris paribus*, pneumonia is more easy of cure than pleurisy, and that the two diseases united are more formidable and oftener fatal, is it not a reason why a veterinarian, jealous of his reputation, ought to be able to distinguish one from the other? But, how is he to acquire that diagnostical precision, unless through the valuable aids of percussion and auscultation? By these unerring lights, the practitioner will see his way sufficiently clear to employ this or that medicament, according to the nature, seat, and duration of the disease. Such alone constitutes rational practice. And, to go a step further, how much better a situation will he be in, then, to inform his employer of the probable result of the case?”

The SYMPTOMS of pleuro-pneumonia, as might be predicated, are those of pneumonia and pleurisy combined, the one or other prevailing according as one or other disease predominates. Although some French writers have given descriptions of this, distinct from those of the other two diseases, I do not discover that they have succeeded in eliciting any pathognomonic signs, save such as are obtainable from percussion and auscultation.

The TREATMENT must likewise be of the same compound character, partaking of what is recommended both in pneumonia and pleurisy; making it bolder or more active, and modifying it, according as the case shall evince acuteness or chronicity, more of one disease than of the other.

HYDROTHORAX.

HYDROTHORAX, or *water in the chest*, is, as we have seen, a very common termination of pneumonia with pleurisy; it may also follow compound bronchitis, or it may occur without any discernible disease or inflammatory action whatever about the chest. As a serous membrane, the pleura may pour forth fluid into the chest in accordance with the same law by which other similar parts become dropsical, either from some constitutional diathesis, or from some local disposition. I repeat, this is possible, and has occurred; but it is a rare case indeed, compared to those wherein hydrothorax supervenes upon inflammatory action, and that of a sub-acute or chronic nature. There are, again, certain dropsical states of body in which hydrothorax, ascites, and hydrocephalus, all co-exist; and are accompanied by swelled legs, sheath, belly, &c. When inflammatory action within the chest, though subdued, is not removed, but continues creeping on, as is indicated by the pulse and other febrile symptoms remaining,—the patient not rallying as he might be expected to do, but feeding daintily, looking dispiritedly, or spiring up for one moment (at the approach of anybody, or at the sight of food) to be again downcast the next—there is great reason to apprehend that the chest is filling with

water; on which account we ought to lose no time in seeking confirmation on so important a point.

SYMPTOMS, as follow :—Short, quick, laboured respiration; and yet not so strikingly manifest until there supervene the latter stages, at a time when the chest comes to be nearly full of water; when the distressed animal is seen to exert to the utmost every inspiratory power he possesses. Should the patient lie down, which is seldom the case, he cannot long remain lying; and the side upon which he lies is the one that contains the—or the most—water. D'Arboval says, the intercostal spaces are enlarged. The pulse, which is small and quick, as the disease advances becomes quicker and less perceptible, until, at length, it cannot be felt at all at the jaw. The horse, led out, steps with his fore-legs wide apart, and stiffened, and is often unsteady, reeling in his gait. The breast, belly, and sheath show dropsical swellings, which, by degrees, fall into the legs.

AUSCULTATION AND PERCUSSION.—Unless gas or air be present with the water in the chest, which can be but rarely the case, it is now ascertained, that—so far from any undulation or fluctuation or bubbling sound being perceptible, as so many have fancied they have heard—hydrothorax is denoted by an absence of all sound. There is no murmur, no resonance on percussion; in fact there can be none in such regions as are filled by water alone. The readiest method of obtaining a knowledge of the actual presence of water, is, to direct some person to tap with his hand one side of the thorax, while the practitioner closely applies his ear to the other side, directly opposite.

WATER IN ONE OR BOTH CAVITIES OF THE CHEST.—Touching this part of our subject, some new light appears to have been shed upon us by some French veterinarians. Rigot in 1827, Delafond in 1830, and Bouley in 1836, have invited our attention to the new fact of the mediastinum of the horse being so constructed as to admit of a communication between the two pleural sacs. They say,

The mediastinum of the horse possesses neither the aspect nor the texture of the pleura: it is thin, diaphanous, deli-

cate, composed of loose filaments, crossing one another in every direction, and forming a transparent tissue, bearing the closest analogy to the woof of lace. The areolæ, close together, and hardly perceptible in the young subject, grow larger with age, and soon render visible, here and there, a multitude of either round or irregular apertures, which establish a direct communication between the two pleural sacs. This is a peculiarity important to become acquainted with. It explains the gravity of chest-effusions in horses; it renders obscure and difficult of distinction the side affected in pleurisy, since the fluid runs from one cavity to the other, and thus gives rise to double hydrothorax. It is certainly *possible* for the fluid to pass through the natural openings, enlarged, of the mediastinum; but Delafond has discovered in eleven cases of pleurisy, that, in fact, there was a rupture of this frail partition. The same skilful veterinarian has remarked, however, that this communication is not invariably present, although there may be effusion in both pleural sacs. He has twice found it wanting.

The TREATMENT OF HYDROTHORAX is an affair of desperation. We have more chance of succeeding in attempts to prevent than to remove it: we must, therefore, endeavour to check the disposition, and avert the secretion. We must not suffer inflammatory action, however apparently trifling in degree, to lurk about the chest; but by continued medicinal and derivative measures persist in our efforts to subdue it, or to translate it to parts where it cannot do the same harm. In sub-acute and chronic pectoral affections, which, I repeat, are especially likely to end in effusion of water, we must continue to push the Plummer's ball: our principal object being now, more than ever, to increase the action of the several emunctories of the body—the kidneys, the skin, the salivary organs, &c. Gohier speaks in high terms of cantharides as a remedy for incipient hydrothorax. Knowing its active diuretic properties, I have often been induced to give it in cases of dropsy, and, I think, with advantage; but not in the large doses. Gohier gives from a drachm (*gros*¹) to a

¹ A *gros* is equal to 3·82 grammes, of 15·348 grains troy, each.

drachm and a half daily, incorporated with double the quantity of turpentine and aloes, and a sufficiency of honey, divided into two or three doses, and finds it produces copious evacuations of urine, and, in some cases, slight excoriations about the mouth and inside of the lips. To these observations, D'Arboval very properly subjoins, that as cantharides is one of that class which we denominate irritating poisons, and is sometimes attended with very violent action on the bladder and mucous membranes in general, we ought narrowly to watch its operation. Debaux and Vaison have derived benefit from the exhibition of large doses of tartar emetic: from 4 to 6 drachms (*gros*) a day have brought hydrothoracic patients round into a state of convalescence in three days.

PARACENTESIS, or *tapping the chest*, has been, by different veterinarians, resorted to as a remedy where a quantity of water is known to have collected. The indications regarded in human medicine for urging the performance of this operation are, cases of *acute* hydrothorax, in which there has evidently been a *rapid* and copious effusion of water into the bag of the pleura. Lafosse, years ago, declared it to be a cure for hydrothorax consecutive on inflammation. He recommended that about half the fluid collected should be drawn off, and that then about the same quantity of vulnerary decoction should be injected. Two hours afterwards he draws off two thirds of the remaining water, but injects only one third. In two more hours he empties the chest, and throws in about $3\frac{1}{2}$ pints (2 *litres*) of the same decoction diluted. Gohier, from unsuccessfulness in many cases, and from often having seen it do mischief, has altogether relinquished the operation. Massot cured a mare, seven years old, by tapping.

This mare had, six months previous, been the subject of acute pleurisy, which left these symptoms:—skin dry, coat pen-feathered, gait unsteady, extremities cold, pulse slow, membranes pale and infiltrated; fits of coughing on the least exercise: pupils dilated, stupor, oppressive breathing, pain of the right side of the chest, elevation of the ribs,

with considerable œdema of the part, which accounted for the dull sound on percussion. The ear, applied above the sternum, detected a dull protracted rumbling sound, similar to what liquid within a rolling cask would make. The therapeutic means employed having proved of no avail, and the animal being threatened with suffocation, Massot decided on puncturing the chest between the 5th and 6th rib, behind and upon a level with the point of the elbow. Through this aperture six pints of limpid serosity first flowed; afterwards it came away yellow and thick, and, at length, like to coagulated albumen. A month after the operation the mare performed a long journey.

My own PRACTICE has proved unsuccessful. I have frequently performed tapping, and as frequently failed in any good result.

From one old horse I drew off ten gallons of water, seven quarts from the left side, and thirty-three from the right side. He died on the fourth day succeeding the operation, without having been in the least relieved by the evacuation. After death, six gallons more were found within the chest, and one quart within the pericardium.

In another case I drew twelve quarts of water from the left cavity; and, five days afterwards—the animal not having experienced any relief—five quarts were taken from the right side. By the last evacuation the symptoms appeared to have been aggravated. Death ensued on the third day after the last operation. Fluid was found within both pleural sacs, amounting altogether to three gallons, and there was mingled with it a quantity of purulent matter.

SUCCESS IN OUR OWN COUNTRY.—It now becomes my pleasing duty to lay before my readers some accounts of cases of success, and those of a most unequivocal description, which have occurred to British veterinarians. The first is one furnished to me by the late Professor Sewell.

On the 16th of August, 1824, a bay horse, five years old, was admitted into the Veterinary College for pleurisy. The attack had commenced the week before, and he had been bled and rowelled, and had taken laxative medicine. The

animal had much wasted in flesh, and, on being led to the stable, was observed to falter in his step, as though he was very weak. The respiration was oppressed and quick; the pulse 75; and the other symptoms present were such as to indicate hydrothorax. He was bled again; took aloes \mathfrak{z} ss; was turned into a cool situation; had his legs flannel-banded; and was ordered a light diet. The day following, when the ear was applied to one side of the chest while the other was struck, undulations were perceived most distinctly on the right side. A trocar was plunged into the left cavity, and about an ounce of fluid issued. But from the right, which was next penetrated, four gallons of serous fluid were drawn. Abatement of respiration and pulse followed the operation. The next day—the 18th—the respiration was less oppressive, the pulse 50, the bowels open, the appetite improved. The left side was tapped again; but without effect.—On the 19th the respiration tranquil, pulse 45—the right side was trocared again; two gallons more were evacuated. Green vitriol \mathfrak{z} ss given.—22d, General amendment; pulse 40. The right side once more tapped; but this time with no result. Repeat ball.—26th, Pulse 36: discontinue ball. From this period he gained flesh surprisingly fast.—November 7th, being considered sufficiently recovered to leave the College, he is discharged, “cured.”—On the 7th of January following he experienced a fresh pulmonary attack while at straw-yard; but no symptoms of effusion appeared, and all passed off again. After this, he continued in health for two years, and was then sold.

The SECOND CASE OF RECOVERY is one highly creditable to the curer—Mr. Webb, of Whitechapel—“although not a *graduated veterinary surgeon*.” It is contained in ‘THE VETERINARIAN’ for 1835.

The horse belonged to Mr. Batley, of Whitechapel, who bought him at a country fair. He was eight years old, and cart-bred. On the 30th September, 1835, Mr. W. was requested to attend him. He saw him at nine o’clock in the evening. The conjunctive and Schneiderian membranes were highly injected; the extremities excessively cold; the

mouth hot and dry; the breath hot; the breathing laboriously quickened; the inspiration lengthened, and the expiration rapid. The fore legs were wide apart, and, as it were, immoveable: anxiously regarding his sides. Head protruded; nostrils expanded. Pulse 97, and oppressed. The cause of the disease was change from cold to heat.

TREATMENT.—V.S. ad lbvij from a large orifice: as much as he would bear. Soon afterwards he appeared much eased. Seton in the breast, and one on each side; and to take calomel ʒss, nitre ʒj—flannel bandages. And in the morning to be led to my infirmary, the distance being short.—October 1st, Pulse 104. Repeat ball, with the addition of ʒij camphor.—2d, Better; pulse 85. Repeat ball with digitalis ʒss. Setons dressed.—3d, Pulse intermittent, from 60 to 75. Gave aloes and calomel, of each ʒss, digitalis ʒj, nitre ʒj, and dressed setons.—4th, Pulse lower, still intermittent. Ball repeated, and setons dressed.—5th and 6th, The same.—7th, All the symptoms suddenly abated, when, suspecting what had taken place, I had recourse to paracentesis. I trocared the thorax between the eighth and ninth ribs. From the left side one pint of serum was obtained; but from the right eighteen pints were abstracted.—8th, The animal being very much debilitated, I determined to give him tonic medicine. Blue vitrol ʒij, gentian ʒss, ginger ʒss, twice a day. 9th, Tapped him again, and obtained from the right side five pints, but none from the left.—10th to the 16th, Tonic balls were given while he remained at my infirmary. Now at work; doing well.

The THIRD SUCCESSFUL CASE is one sent to 'THE VETERINARIAN,' in 1836, by Mr. Scriven, Aberford.

A bay horse, belonging to the Union Coal Company, was on the 5th of January attacked with inflammation of the lungs. He was bled; had ʒij of aloes given, and otherwise was ordinarily treated. On the 9th I saw him. The pulse was 60, hard and full; the heart bounding against the ribs; extremities cold; appetite much impaired. Draw four quarts of blood, and give nitre and emetic tartar,

of each ʒij, digitalis ʒj, in ball, thrice a day. Clysters occasionally; body and legs to be kept warm; mash and gruel diet.—10th, Much the same. Blister sides. Continue ball, &c.—11th, Pulse less full and intermittent; omit digitalis; continue other treatment.

16th, Pulse increasing. Very restless, pawing litter, and attempting to lie down, yet afraid to do so; fæces thin and fœtid. V.S. three quarts, catechu ʒij, digitalis and opium ʒss each, night and morning.—17th and 18th, Better. Pulse 54; dung firmer; appetite better. Nitre and emetic tartar, of each ʒij, night and morning.—22d, Very dull; appetite impaired; pulse increased; purging and fœtid fæces. Catechu ʒij, opium ʒj, chalk ʒj, in gruel, thrice a day. Starch injections.—23d, Still purging; appetite worse; becoming weak. Continue treatment, adding half a bottle of port wine to each dose.—25th, No better; losing flesh so rapidly as to extinguish all hope of recovery. Give night and morning chalk ʒj, catechu and opium each ʒj, Peruv. bark and gentian, of each ʒij.—27th, Purging subsiding. Appetite better. Discontinue the wine, but go on with the medicine.—28th, Purgation ceased. Appetite better, but has now great difficulty of breathing. Auscultation indicated great impediment in the right lung, and percussion elicited a dull sound. This night, on relating the case to Mr. Dick, he replied, from the account given, the continued purging and rapid loss of flesh, he suspected hydrothorax.—29th, Mr. D. went to see him, and became confirmed in his opinion. The effusion was chiefly on the right side; the left was nearly free. Paracentesis thoracis was at once determined on. A small incision was made with a lancet between the 11th and 12th ribs. The integuments being drawn aside, the trocar was introduced about four or five inches above the cartilages of the ribs, close to the anterior margin of the posterior rib, in an oblique direction, upwards and rather forwards. On withdrawing the trocar, the fluid appeared in a full and copious stream, which was allowed to flow as long as possible without the admission of air through the canula into the thorax. Eight

quarts were withdrawn, and the skin allowed to close over the wound. The horse experienced great relief, and immediately began to breathe more quickly. The fluid, on standing to cool, quickly coagulated. About three fourths of it assumed the nature of fibrine, and the remainder was of serous character. Give thrice a day ferri sulph. et resin. āā ʒij, camphor. ʒj.—30th, Eats better. Respiration more natural. Wound closed. Continue treatment.—31st, Auscultation detecting some fluid on the left side, paracentesis was performed; but scarcely a pint was abstracted. Continue treatment.

Feb. 3d, Pulse increasing; breathing more laborious; appetite declining; water re-accumulating in the right cavity. Operation again performed in the same intercostal space, but a little below the former opening. Five quarts were obtained in a full stream, which again appeared to afford great relief. Continue treatment.—14th, Pulse rising. Add digitalis ʒj.—16th, Pulse diminishing; respiration not so laborious. Omit digitalis. Continue iron, resin, and camphor.—21st, Very restless; abdominal respiration laborious. Regards his sides, and drily sighs. Pulse hurried and irregular; extremities cold; symptoms altogether betokening speedy dissolution. Paracentesis once more on the same side and intercostal space, but with considerable difficulty. Three quarts were drained off, but the stream was much impeded, either by the adhesions of the pleura, or by clots of fibrine plugging up the mouth of the canula. The patient experienced much relief again, and once more rallied. Continue medicine.—March 3d, Has had another relapse—has been exceeding weak, and has lain down for the first time since his illness; but this aggravated the symptoms so as even to threaten life, so that he only lay for a few moments at a time. He then rose in a staggering manner, and constantly regarded his flanks, as if pointing out the seat of pain and imploring relief. Paracentesis again on the right side, anterior to the latter puncture. This was followed by a copious flow of a turbid whey-like fluid, seemingly a mixture of pus and serum,

which had a very offensive smell. It was allowed to flow as long as it would without the admission of air through the canula into the thorax. Eight quarts were drawn, from which the horse experienced more relief than from any previous operation. Continue treatment.—5th, Appetite amended, and has lain down two or three times. Treatment as before.—7th, Improves gradually; appetite increases; lies down frequently without seeming disturbance. Treatment continued.—12th, Feeds well, and rests well. Continue remedies.—April 22d, Doing well. Mr. Youatt saw the horse on the 19th June following: he was then at work, and apparently well.

SOME IMPORTANT DEDUCTIONS are to be elicited from these cases. They have been narrated in detail with a view of, altogether, affording such a connected and faithful history of hydrothorax, its progress, its varieties, its changes, and the manner in which it has been cured by paracentesis, as is to be surpassed only by actual observation of the cases themselves.

TO PERFORM PARACENTESIS we require a *trocar*, and one longer and larger than surgeons use, who are very particular about it being a *fine* trocar. The canula of the trocar I have, measures four inches in length and five sixteenths of an inch in diameter. That part of the thorax which is the most dependent, the most conveniently come at, and where no mischief can ensue from perforation, is to be chosen for puncture. I have generally myself operated between the eighth and ninth ribs, close to their cartilages. Mr. Dick operates—at least Mr. Scriven did—between the eleventh and twelfth ribs, about four or five inches above their cartilages. The spot being determined on, the integument is to be drawn to one side, either by an assistant or with the operator's left hand, and through it, in a state of tension, is to be pushed, with a rotating motion, the point of the trocar, keeping it obliquely directed, upwards and inwards, as you proceed. Some make an incision through the skin with a lancet first; and I think it very advisable, on account of the facility it gives to the introduction of the trocar.

The moment the trocar has cut its way through the wall of the side, which will be felt by the cessation of resistance, the stilet is to be withdrawn, leaving the canula within the wound, through which it must now be pushed as far as it will go, or until fluid runs out in a copious stream. Though the water may gush out at first, it seldom continues flowing long in a full stream; often, indeed, its stream becomes interrupted, or altogether arrested, either by the lungs coming against the mouth of the canula, or some flakes of lymph collecting about it or flowing into it, to remove which it becomes necessary, from time to time, to pass a whalebone or iron probe through the canula. From one or other of these causes, it has happened that no water has followed the introduction of the trocar, even though the cavity perforated has been all the while full; as a general rule, therefore, do not withdraw the canula when no fluid issues, until quite assured that it is fairly within the cavity, and that its mouth is free from all obstruction. When the cavity is so nearly emptied of its water that fluid only issues in jets each time the lungs expand, the canula ought to be immediately withdrawn, else, during the intervals while no water is flowing, air will be apt to rush into the chest; and air within the thorax is said to do harm, and therefore we must avoid it. The valvular covering afforded by the return of the skin drawn to one side will effectually close the wound after the operation.

HYDROTHORAX IS NOT NECESSARILY INCURABLE.—The cases I have related prove this. Under what circumstances have we most chance of curing? Let us consult our cases again. We find that in all of them the water was confined to *one*—and that the right—side: the quantity in the left cavity was too inconsiderable to notice. This then—as appears in theory, so in practice—constitutes a favorable indication. We find again—with the exception of Magot's case, in which the quantity of water was inconsiderable, and which, after all, looks like a relapse—that two of them were tapped in the second, the other in the fourth week after attack: none, therefore, could be called old or chronic

cases. The secreting membrane could in neither case be said to have acquired any *habit* of secretion or any materially altered organism. *Age* may have some influence: Mr. Sewell's patient was five years old; Mr. Trapp's eight. *Stamina*—healthiness of constitution, and in other respects—must have great influence. All these circumstances—and there are others—ought, I repeat, to be taken into consideration in dealing with a case of hydrothorax.

ARE WE JUSTIFIED IN OPERATING IN *every* CASE?—This is a question somewhat difficult of solution. On the one hand, we are told that instances are to be adduced in which re-absorption of the effused fluid has been effected by treatment, and that, as there is great danger and but little chance of success attendant on paracentesis, we are certainly not justified in operating until every other means has been tried. On the other hand, the advocates for the operation tell you, that, unless you draw the water off *early* in the disorder, you have not the same chance of success. "If," says d'Arboval, "we saw nothing in a dropsy beyond the unusual circumstance of water existing where there ought to be none, it is reasonable enough that we should let out the fluid, and thus perform the cure. But of what use can paracentesis be when the dropsy is dependent upon affection of the heart or large vessels, while the cause remains? In the case of acute pleurisy, do we not, in the act of puncturing the chest, as well as by exposing a membrane, already in a state of intense inflammation, to the contact of air, create fresh irritation? And, should the case be chronic, do we not run the risk of converting it into acute, and thus destroying our patient? In a word, paracentesis is an operation too perilous, and too often fatal in animals, for us to dare to countenance it. And besides, notwithstanding we may inject, there is the inevitable inconvenience attending it, of the pulmonary organs, in consequence of being no longer compressed and sustained by the surrounding fluid, falling suddenly into a state of collapse, a change bordering on death." For my own part, where we have attended a case sufficiently to put our treat-

ment to the test, and where, in defiance of such treatment, it has gone on to produce hydrothorax—and such a hydrothorax as must inevitably end in the death of the patient, and that very shortly—I do not see what other reasonable course we have to pursue than to operate. It is true, we have but very slight hope of any good result: but, having done all we can, like a drowning man, we are glad at last “to catch at a straw.”

TREATMENT AFTER PARACENTESIS.—Should the quantity of water abstracted be considerable, I should advise the encircling of the thorax with some very long bandage or roller, with a view of giving support to the contained viscera; perhaps a broad circingle would be the thing. The compression must be only such as can be borne; and should it be found to inconvenience the animal, it ought to be immediately removed. In a medical point of view, there are several objects to be fulfilled:—the watching of the inflammation, the support of our patient, the prevention of fresh effusion of water. When mercury, during the progress of the disease, has had its full trial, I think the tonic-diuretic plan seems likely to best answer. I would give preparations of iron or copper, in combination with emetic antimony, digitalis, gentian, turpentine, cantharides, &c. Either of the following balls may be given, morning and evening, providing there be no inflammatory symptoms to interdict it:

R Ferri Sulphat. . . . ʒiss	R Cupri Sulphat. . . . ʒj
Cantharid. . . . ʒss	Pulv. Digitalis . . . ʒss
Gentian. Rad. . . . ʒss	Antimon. Tart. . . . ʒij
Theriace q. s. ut f. Bol.	Terebinth. Vulg. q. s. ut f. Bol.

In cases where great debility is left behind, not even tonics but *stimulants* may be required. Mr. Scriven gave his patient port wine. Under similar circumstances, I am in the habit of giving malt liquors—porter or ale. Here, also, a nutritive but soft or easily digestible diet ought to be allowed.

ADHESIONS.

In speaking of the effusion of lymph as a sequel of pleurisy, I described it as assuming in the dead body various forms, such as bands, filaments, cobweb-like tissue, &c. When any of these are found attached to the opposed surfaces of the pleura, in such manner as to create permanent unions between the pulmonary and costal portions of that membrane, they are called *adhesions*. As such, they may either consist of recent exudations, and consequently, from their extreme softness and want of tenacity, be very liable to be torn through, leaving pendulous shreds in their places; or they may acquire firmness and consistence, and in the end become organized and *permanent* adhesions. At first, they probably give rise to more or less pain, from the inconvenience they occasion to the play of the lungs within the chest; though, after a time, this uneasiness would appear to cease or diminish, from the adhesions becoming stretched and accommodated. It is not often, however, that we find old permanent adhesions in horses—not near so frequently as in men; and the reason seems to be, that horses are not in general the subjects of those chronic attacks and relapses of pleuritic disease to which, in our changeable climate and with our irregular habits of life, our own bodies are so obnoxious. For an account of the formation of adhesions, and of the short period of time in which they are, in horses, occasionally produced, I must refer my reader back to “Effusion.”

HEMORRHAGE FROM THE LUNGS—*Hæmoptysis*.

This is of rare occurrence among horses; though, from the use and abuse made of them, it might be suspected to be otherwise. When it does happen, it must be regarded as an affection of danger; though, of course, this must depend on the origin, nature, and extent of the case. There appear to be three sources whence the blood may issue: the bronchial membrane, the air-cells, and the parenchyma of the

lung. Horses whose sanguiferous systems are in a state of plethora, are in high condition or very fat, and whose work, though trifling in general, may on occasions amount to violent feats or performances, would seem to be the especial subjects of hemorrhage from membranous tissues; such tissues being, in plethoric habits, overcharged with blood, and consequently, on any extraordinary effort or exertion, liable to give way—to have their loaded and distended vessels ruptured; though the emission may be owing to over-force of circulation, and, thus arising, be said to be “spontaneous.”

There is a form of hæmoptysis, described by Laennec, on account of its anatomical characters, under the appellation of “pulmonary apoplexy;” which is produced by an effusion of blood into the air-cells. It is manifested after death by patchy indurations of a very dark red, whose interior is granulated the same as hepatized lungs; though in other respects these two pulmonic indurations are entirely different. I have seen and recorded something like this in horses: but I cannot just now lay my hand upon the cases.

LESION OF THE SUBSTANCE OF THE LUNG, I apprehend to be the cause of the hemorrhage in those cases of hæmoptysis in which death happens suddenly, and without any previous or premonitory ailment. The horse, during work or exercise, or, it is possible, in the act of excessive coughing, staggers, falls, and dies. My respected predecessor, Mr. Bloxam, has, within the space of nine years, registered three cases of this description; one is entered as “hemorrhage in the lungs;” the other two as “effusion of blood in the lungs;” and one of the three horses dropped down and died while exercising in watering order. Hunting, racing, hard bursts of galloping of any kind, dragging heavy loads, are all occasional causes of this description of hæmoptysis. The same may likewise happen from ulceration of the lungs in phthisis.

The SYMPTOMS of ordinary hæmoptysis—that which arises from emissions from the bronchial membrane—are, defluxions of blood from both nostrils, commonly of the

arterial character and frothy, attended with more or less irritation, coughing, or snorting, and perhaps interruption to the breathing; and every time the horse coughs or snorts fresh quantities are ejected, and often through the mouth as well as nose, and mingled with these ejections will sometimes be found various mucosities. The blood does not run in one uniform stream, as in epistaxis, but is influenced by the respiration and position of the head and neck. The other distinctive signs between the two hemorrhages will be found under epistaxis. In some cases the hemorrhage is attended or followed by febrile disturbance, the breathing proving more or less embarrassed, the pulse quickened, the mouth hot, but the legs deadly cold, or one is cold while another is warm.

TREATMENT.—The cases we have in general to treat being such as arise from plethora, and over-action or excitement, we must seek for a remedy which will reduce fulness of blood, and abate over-action and excitement. This is to be found in bloodletting. This is an evil to be met by its like—*similia similibus*.

When the condition and powers of the horse are such as will bear it, we may at once abstract a quantity of blood, with the two-fold view of temporarily fainting or depressing the animal, and permanently lowering his constitutional powers; but should he be already in a state of low condition, or have become so reduced by repeated hemorrhages, should bloodletting notwithstanding seem advisable, our object must be to abstract as large a quantity of blood in as *short* a time as possible; in order to produce the required approach to syncope, without detracting any great deal of the vital fluid in the present weakly condition of the system. To do this, we should make a very large orifice in the vein; or, what is better practice, draw blood from both sides of the neck at the same time. After bloodletting, take all clothes off the horse, and let them remain off, and dash ice-cold water against his sides and breast: indeed, ice itself applied to them, could it be obtained, would be likely to do good. Empty the bowels by injections: Rodet recommends “lave-

mens d'eau pure *très froide*," with which, and bloodletting, he says he has had great success. Let his diet consist of nought but bran-mash and cold water. Keep him constantly tied and racked up, so that his head be elevated; and do not suffer him to lie down, or move about, or be in any way disturbed. The medicine given with the best effect in man is the superacetate of lead in combination with opium. Turpentine, also, is highly recommended in human practice. And Dr. Copland says the balsams, so extolled for the same virtue, owe their efficacy to the turpentine they contain.

BROKEN-WIND.

The appellation "broken-wind" is apt to convey, to an unprofessional or unequestrian mind, a meaning very different from that which we, from education, professionally attach to it; and there can be no doubt, I think, but that those who first gave this appellation to the disorder did so from the circumstance of the horse affected with it being observed continually to be *breaking wind*, in the vulgar sense in which we ordinarily use the phrase; although the late Professor Coleman, whose theoretical ingenuity was proverbial, was wont to turn the word "broken" to his account, while discoursing on his favorite theory of ruptured air-cells, by saying, that those who gave the name to the disease evidently must have known that something—the lung, most probably—was *broken*. Judging, however, of the pathological knowledge possessed by the old writers on farriery by what is displayed in the works they have left behind them, I must repeat my opinion—and this opinion seems to be confirmed by a disgusting operation they sometimes performed for the disease—that in the *flatus* passed from behind will be found the derivation of this remnant of the cant phraseology of farriery. Be this, however, as it may, it is a name by which the disease is still universally known amongst us; and the only way I see of forcing it into direct application, is, either to admit, with Professor Coleman, that it implies the *rupture* we find in the lung, or to deem it indi-

cative of the peculiar—double or *broken*—sort of respiration that denotes broken-wind. So that, in fact, it may either imply a symptom, or else be significant of the pathological condition in which we commonly find the lungs of broken-winded horses after death.

The DISEASE ITSELF—for as *disease* we are bound to consider it—is so self-evident, so palpable to demonstration, that almost every person conversant with horses¹ is able to detect it; and well enough knows, when it does exist, how valueless the subject of it becomes compared to a sound-winded horse. Notorious, however, as its existence is, yet have the opinions concerning its seat and nature been, from very early times up to the present, both numerous and discordant: indeed, no malady has given rise to such a variety and conflict of opinion as the one before us.

HISTORY.—I shall pass by, unnoticed, all the ancient part of the history of broken-wind—seeing no other purpose its introduction here could serve save that of curiosity—in order to be able to come at once to the theories of its nature in vogue among veterinarian pathologists of the present day. For those prevailing on the continent, we have the best authority in citing from Hurtrel D'Arboval:—

CONTINENTAL THEORIES.—According to this writer, these may be ranged under four heads:—1st, Pulmonary Inflammations; 2dly, Nervous Influence; 3dly, Lesion of the Diaphragm; 4th, Pulmonary Emphysema.

PULMONARY INFLAMMATIONS, in their *acute* form, are not to be regarded as forerunners of broken wind; it is only when they are *chronic*, and are productive of certain morbid alterations or disorganizations, that they can be so viewed. Acute pneumonia, however intense, however extended, is never known to terminate in broken-wind. Chronic bronchitis, accompanied with thickened membrane and mu-

¹ The French veterinarians, Godine, Dupuy, Demoussy, Delafond, D'Arboval, assert that sheep and oxen are subject to broken-wind; and that in them it is occasionally dependent on lesion of the heart. I cannot pretend to offer any opinion on this point myself; but my friend, the late Mr. Youatt, has assured me, he never saw nor heard of such a case.

cosities, has, by Rodet, been placed in the first rank among the causes of broken-wind; while Delafond regards it as but of secondary importance. It is conceived to occasion broken-wind by the violent fits of coughing accompanying it. The air violently forced out, meeting with (mucous) obstruction in the passages, by the re-action of its impulsive force, is driven back into the small bronchi and air-cells, which may thereby become dilated, or even ruptured. This double result has been observed by Laennec, and adopted by Godine, Rodet, and Delafond. It is possible, also, that, through ulceration and perforation of the bronchial membrane, air might get admission and create an inter-lobular pulmonary emphysema. All these explanations, however, fall to the ground in cases wherein no emphysema has been observable; of which there are three reported by Rodet.

NERVOUS INFLUENCE.—This, which originated with Dupuy, is, in D'Arboval's estimation, the most accurate opinion of any. Some abnormal condition, but little known, hardly suspected even, of the pulmonary nerves, preceded by such circumstances as in connexion either with the lung, the stomach, or other part, or through sympathy, are capable of altering the structure of these nerves, or of influencing their functions. Both Dupuytren and Dupuy have remarked symptoms resembling those of broken-wind in cases of compression or section of the pneumogastric nerves.

LESION OF THE DIAPHRAGM.—Girard, jun., in 1822, remarked symptoms of broken-wind in a horse whose dissection afterwards shewed that a portion of omentum had insinuated itself through an opening in the diaphragm into the chest. In another case, treated by Dendry, a knuckle of intestine had got similarly lodged. From these and other recorded similar cases, nothing, after all, can be elicited which throws any light on broken-wind.

PULMONARY EMPHYSEMA, if not the most influential, is the most frequent of the proximate causes. It constitutes also the most elaborate of the opinions; one to which the labours of Laennec and Andral have added very little.

Delafond's account is the best veterinary one, although he has confounded dilatation of the air-conduits with the extravasation of air. We shall transcribe it:—

The AIR-CELLS are little transparent vesicles or culs-de-sac, having partitions of dense cellular tissue, by which they are united into small masses or lobules, rendered distinct by the looser cellular tissue which surrounds them, and connects them with other lobules. In domestic animals the form and number of the air-cells vary, not only with the species, but in individuals of the same kind, according to the age and to the part of the lung they occupy. In young horses and in foals they are small, and closely grouped together, which gives gravity to the lung, and at the same time elasticity; but with age they become dilated, atrophied, and in part destroyed, which renders the lung lighter, less elastic, softer, and of a paler colour. The air-cells are more numerous in the centre of the lung than at the extremities; but are most capacious and at greatest interval within the anterior lobes. This distribution explains why the respiratory murmur is more audible in the middle of the lung.

ENLARGEMENT OF THE AIR-CELL has been observed to the extent or more of a pea. But the cells are very rarely found enlarged in every part of the lung: the anterior lobes, and borders, and mediastinal portion of the right lung, frequently exhibit them; and in the middle of the sound lung are here and there found dilated air-cells; and often these two latter conditions are combined. When *the dilatation of the cells is general*, the lungs, on opening the thorax, appear as if they had been inflated. The atmospheric pressure collapses them only to about one third or one fourth of their volume. They are of a pale rose-colour, elastic, and extremely light; and more buoyant in water than sound lungs. In general, their cells have acquired the volume of a millet or hemp seed, and particularly in the anterior lobes, and along the posterior and inferior borders of the lungs. The parenchyma, on being cut, collapses only to the extent of the incision; and there is no effecting a perfect collapse of it without incising it in every direction.

Squeezed between the fingers, it crepitates, and emits upon the surface numerous little globules of air. If attempts be made to collect this air underneath the pleura, it escapes into the interlobular cellular tissue, and becomes collected into small bladders between the lobules.

In the second kind of dilatation of the air-cells—that which is *local* or partial—when in the anterior lobes they present a sort of rumpled semi-inflated appearance, of a pale rose colour, and consist interiorly of air-cells dilated to the size of a pin's head, or from that to a millet seed. Deep incision, laying open a bronchial tube, collapses them; but pricking with a pin does not. Circular compression upon any part effects perfect collapse, the air escaping into the bronchi. The mediastinal lobe of the right lung, thus affected, presents similar characters; but when the local dilatation occupies the borders of the lungs, it shews itself in extensive, not prominent, rose-coloured irregular eminences, and the parts appear swollen, and inwardly display very distinctly the air-cells become enlarged and more transparent. The lung pits from the pressure of the finger; and the act of pression, dispelling the air, occasions slight crepitation. Inflation of the entire lung causes the corrugations and eminences to swell before the remaining sound portion receives the air.

In the third kind, or *broad-cast* air-cell dilatation, slight elastic eminences are perceptible, paler in colour than the sound parts, and varying in magnitude from a lentil-seed to a hazel-nut or walnut. These eminences are spread about upon the surfaces and borders of either one or both lungs. Sometimes they are very numerous: Delafond has counted as many as thirty-five upon the surface of both lungs. Like the large corrugations, they collapse by incision; and when the lung is gently inflated through the windpipe, they swell and rise towards the surface before the surrounding parts become inflated. The middle of the parenchyma is not exempt from these alterations. To demonstrate this, expose the whole lungs to the air for twenty-four or thirty-six hours, and afterwards incise them in all directions. The

incised surfaces, commonly of a reddish-black, are marked with bright red spots, variable in size, of which the most superficial communicate with the exterior eminences. They are occasioned by the chemical action of the atmospheric air, remaining within the dilated air-cells of the globules, on the colouring matter of the blood effused into the surrounding tissue.

With the three kinds of dilatation just described, we sometimes meet with dilatation of the small bronchial tubes running to the lobules increased in their volume. These minute divisions, unprovided with cartilaginous rings, have been discovered double the diameter they are in a sound state. The membrane lining them is pale, thin, and coated with a clear and plastic mucus.

Now and then we find a middle-sized bronchial tube dilated, which is supplying several morbid lobules. This especially happens in emphysema resulting from chronic inflammation of the mucous membrane, accompanied with abundant secretion; and these dilatations are attended with separation of the cartilaginous rings, and with paleness, ulceration, and even perforation of the internal coat. In this case, the bronchi, and particularly such tubes as are dilated, contain a white, plastic, inodorous mucus.

Whether it happen that one or more air-cells become suddenly ruptured from some effort, or whether the same happen to air-cells already dilated and attenuated, or whether the breach be the result of ulceration and complete perforation of the membrane, air makes its escape into the interlobular cellular tissue and produces emphysema. If in this condition the lungs be examined soon after death, the pulmonary lobules will be found more or less isolated, in consequence of the extravasated air separating them from one another. This stream of air may be made by pressure to pass from one cellule to another, and to form bubbles or vesicles, of an indefinite shape, and of volume varying from that of a lentil to a nut, or even to a large hen's egg. They occupy particularly the borders and extremities of the lobes, and often have the pleura for their boundary, which

itself becomes raised by the air underneath. Pierced with a pin these little bladders, as well as some of the neighbouring vesicles, empty themselves completely. Moderate insufflation of the lung expands simultaneously the pulmonary vesicles and meshes of the cellular tissue; more force sends the air underneath the pleura, and produces large bladders along the borders and extremities of the lobes.

Inter-lobular emphysema is often combined with air-cell dilatation, sometimes with bronchial dilatation, rarely with varico-aneurismal dilatation of the small vessels underneath the pleura.

THE ENGLISH HISTORY OF BROKEN-WIND will be found meager compared with the continental. Most of our earlier writers on farriery derived their explications of its pathology from human medicine; while the moderns, with few exceptions, have embraced the doctrine of emphysema.

THE DOCTRINE OF RUPTURED AIR-CELLS, according to Mr. Bracey Clark, originated in this way:—"In the year 1795, being engaged in the dissection of a grey mare sent to the Veterinary College to be destroyed on account of this complaint, on opening the chest, the lungs appeared free from inflammation, being very white: and, as they appeared free from redness and increase of colour, the general concomitant of disease, we were led for awhile to consider the lungs as not the seat of the disorder, as others had done (for several pupils were present at the dissection). On cutting into their substance, no inflammation was perceivable. On examining them more closely, we observed a small bladder or vesicle on the outside of the lungs, in the external investing pleuritic coat: this was conceived by some who were present to be a tubercle, and that tubercles might be the cause of broken-wind. Suspecting, however, from its appearance that it was not solid, but contained air, it was punctured, when it immediately subsided. This instantly suggested to the writer (Mr. B. Clark) that the lungs were actually in a state of *emphysema*, or that air was contained in a state of extravasation within their substance; and which not only seemed evidently the case in this instance, but which we

have since fully verified by examination and dissection of a considerable number of cases of broken-wind, and found it to be a constant appearance. This extravasation of air in the substance of the lungs, is, perhaps, occasioned by rupture of the air-cells, as suggested by Mr. Coleman at the time; unless it be formed in them, and thrown out by some morbid operation of the blood-vessels, as sometimes happens in the intestines and vagina: for the exact way in which this emphysema arises has not yet been ascertained."

THE LATE PROFESSOR COLEMAN'S THEORY OF BROKEN-WIND.—"This is a disease which, in all probability, is sometimes present in man, but has hitherto been unattended to. In horses it is a very common disease; and though I am not aware that its nature has ever been described by any author, yet it would appear that those who called it *broken-wind*, thought that something was *broken*. It is a rupture of the air-cells, in consequence of which an extravasation of air takes place into the fine cellular membrane which connects them together, and this at once explains the characteristic symptom; which is, that the animal occupies considerable time in performing the act of expiration, but a very short time in inspiring. If you observe attentively the flanks of a horse under this disease, you will perceive that he is a long time in contracting or drawing them up, during which he is expiring; that act being accomplished, however, the flanks fall almost instantaneously into the successive act of inspiration. The horse is, in fact, a length of time in squeezing out the extravasated air from the reticular membrane, where it has not the same easy egress it had before, into the bronchi; though, notwithstanding this act is attended with so much difficulty, it is evident that the vacuum formed within this membrane is as easily restored to an equilibrium as before any rupture had taken place.

"It is very common in this disease for horses to discharge air from the rectum: the same circumstance, however, is observable in roarers and thick-winded horses, but not in the peculiar manner in which it occurs in broken-wind. This circumstance has given rise to a very ridiculous operation, viz.

that of making an *artificial anus*. Here, the effect is mistaken for the cause, this being produced simply by the efforts such horses make to enlarge the cavity of the chest by the descent (receding) of the diaphragm; which, of course, makes additional pressure on the bowels, and thereby causes the expulsion of wind. Another very common result is, that such horses dung a great deal on first undergoing exertion; which like the former, however, ceases the moment the breathing becomes less oppressed.

“On examining broken-winded lungs, we find the surface, externally, assuming all the appearances of health; though, if compared with lungs in a normal state, we shall find them specifically lighter, arising from their containing a quantity of air, which the last expiration of the animal was unable to rid them of.”¹

Mr. CHERRY, the Principal Veterinary Surgeon to the Cavalry, happening in the year 1823 to have a strikingly well-marked case of broken-wind in his infirmary at Clapham, was kind enough to inform me he would have the horse destroyed any day I could be present.

Accordingly, I attended, and no sooner was life extinguished than we removed the lungs, trachea, and larynx from the body, and submitted them, as yet steaming with vital vapour, to close and careful examination. The general aspect of every part was that of perfect health, save that the lungs were paler—being of a light pink hue—than they generally are at this time of life—eight years old. The pleura was everywhere in apparent health, except in those places where it was elevated, by air underneath, into vesicles; there, it was opaque and whitish, giving the vesicles the appearance of so many white tubercles. The vesicles were most numerous and conspicuous upon the anterior lobuli; but both lungs had, in every part, a crackling emphysematous feel, and the air they contained could be readily made to traverse their substance by compression. They were remarkably buoyant in water, particularly the anterior lobes. When inflated, the air appeared to distend

¹ Professor Coleman's ‘Lectures’ at the Royal Veterinary College.

the parenchyma; but, what seemed very remarkable, *it neither increased the number of the vesicles, nor enlarged those already existing*. After inflation, the entire lung became still paler, and crackled more when squeezed with the hand. This Mr. Cherry thought arose from the rupture of more cells; I had, however, and still have, my doubts on that point. The bronchial and tracheal membranes, though of their natural colour, were *much thickened*. The membrane covering the arytenoid cartilages was *likewise thickened, and studded with little hard papillary eminences*. There was no alteration in the *form* of the trachea.

Mr. Cherry has since examined another very decided case of broken-wind, destroyed at the request of the owner on Mr. Cherry's own premises, in which he found perfectly analogous appearances.

Feb. 14th, 1843, H. P. Bks.—Col. Cavendish ordered his black mare to be destroyed, on account of incurable lameness in her feet, particularly in the off fore one. She was, in fact, foundered from navicular disease. She had had a cough for several years (being now above 16 years old); and the last time I examined her, on account of her lameness, I, hearing her cough, pronounced her to be *going* broken-winded; since which, although her cough leads to that opinion, there has been no *decided* movements of the flanks, to warrant any conclusion. About 5 o'clock this afternoon she was shot. Her lungs were preserved, and next morning examined. They had not collapsed like healthy lungs; but presented the pale pink hue, and had the true emphysematous character of broken-winded lungs; though the emphysema, which was greatest in the anterior lobuli, and more in the near than in the off-lung, did not prevail to that extent which in more advanced or confirmed cases it is found to do. There was some appearance of thickening, with opacity and whiteness, about the membrane lining the trachea and bronchial tubes; but it was not in the latter of a very decided character. The larynx was not preserved.

IN THE FOREGOING PATHOLOGICAL ACCOUNTS, two morbid

states demand our particular attention : these are, *emphysema of the lungs*, and *alteration of the membrane lining the air-passages*. It is the former, however, which has—perhaps from its presence being more constant and uniform—in an especial degree attracted the attention of veterinarians, of our own country in particular ; and to that degree that some—among whom stood prominent the late Professor Coleman—have unhesitatingly asserted, that emphysematous lung constituted the pathology of broken-wind. In this advanced state of science, however, we dare not hasten to such a conclusion before we have examined and well weighed in our minds some facts which appear to militate against this theory. That broken-wind, or a disorder undistinguishable from it, may arise, and yet

EMPHYSEMA NOT PRESENT, we have unquestionable authority for affirming : in France, we have Godine, Volpi, Rodet, D'Arboval, and Delafond ; in England, Professors Sewell and Dick, Messrs. W. Smith and Hallen ; and we may now add, Mr. Gloag, Veterinary Surgeon, 11th Hussars, who, in 1851, committed to paper some admirable "Thoughts" on the subject, which will be found in vol. xxv of 'THE VETERINARIAN.' Even Delafond, who is the greatest French advocate for the emphysematous theory, avows that, out of fifty-four broken-winded horses which he examined, he found forty-five with emphysema, including dilatation of the air-cells of the lungs ; whence he concludes that only about *three fourths* of the cases of broken-wind are of this nature, leaving one fourth to arise from other causes. Although the fact, that symptoms of broken-wind may issue from other pathological conditions appears irresistible, still are we left in a position fearlessly to pronounce, that the ordinary and by far the most uniform lesion present with the disease, is emphysema.

DOES EMPHYSEMA EVER EXIST WITHOUT BROKEN-WIND ?—Yes, of one description, but not of the other. For emphysema of the lungs, which was first observed by Dr. Baillie, but afterwards more fully investigated and explained by

Laennec, is, according to the latter, of two kinds—vesicular and interlobular. *Vesicular* or *pulmonary* emphysema consists either simply in the dilatation of the minute bronchi and air-cells, or in the rupture of the parietes of several contiguous cells, and their consequent dilatation into one; *interlobular*, in the infiltration of air, in consequence of rupture of the membranous partitions between the lobules of air-cells, into the cellular tissue interposed between the lobules, and connecting them together. Mr. Stokes,¹ however, has very properly objected to the simple *dilatation of the air-cells* being so classed, “inasmuch as emphysema is not the principal characteristic of the disease, and though a frequent yet by no means a constant complication.”

Laennec says, the dilated cell, though it commonly does not exceed a millet-seed, may reach the magnitude of a cherry-stone or French bean;² Dr. Townsend, however, in more than one hundred dissections which he made of emphysema, “never, except in one instance, saw the air-cell dilated to the size of a garden-pea.” In the majority of cases, such cavities are formed by several cells being thrown into one, in consequence of their delicate partitions being overstrained or ruptured. In this manner, one entire lobule may become one (single) cell; or the interlobular partitions may themselves be lacerated, “and their respective lobules thrown into one large cavity, which usually reaches the surface of the lung and forms a projection under the pleura.”³

I have myself on several occasions met with vesicles on the surface of the lungs—owing to the presence of air underneath the pleura, and the consequent elevation of the membrane—which were not influenced by inflation nor removable by pression; nor would the air they contained support combustion. These were, none of them, cases of

¹ In his ‘Treatise on the Diseases of the (Human) Chest.’

² In an excellent article on ‘Emphysema,’ in the ‘Cyclop. of Pract. Medicine.’

³ The best method of demonstration in these cases is to dry the lung; previous to which, if requisite, it may be inflated.

broken-wind, nor was there any interlobular emphysema present. How, then, are we to account for the existence of these sub-pleural vesicles? In reference to man, Laennec explains their offspring by finding them to be dilated air-cells *protruding*: "that this is the case," he says, "is proved by the circumstance that we cannot force the contained air by pressure of the finger to leave its place." Whether such cases as the following be of this description, I must leave to be determined. Dr. Baillie thought that the air within them was secreted.

The FIRST CASE in which I perceived these surface or pleural vesicles, was that of a bay horse, who had, during a run with the Surrey fox-hounds on the 9th November, 1822, been over-ridden by his master, the late celebrated Captain Harvey, of Eltham, from which, on the fifth day afterwards, he died. The cavity of the pericardium contained a pint of fluid. The right lobe of the lungs was sprinkled with large, white, soft tubercles, was of a pink colour, and *presented several large bladders of air*, which raised the pleura from the surface.

The SECOND was a horse admitted into the infirmary of the Ordnance at Woolwich, on the 5th February, 1823, with symptoms of disordered bowels. His disease was never made out. He died on the 1st of June succeeding. The liver proved the chief seat of disease. Twenty ounces of water were found in the pericardium. One lung was remarkably pale—quite bleached in appearance; the other had its usual healthy aspect. *Both right and left lungs presented several bladders of air upon their surface, two or three of which were as large as apples cut in halves.* The pleura of the vesicles was cleanly and completely detached by air from the lung; the connecting cellular membrane having been absorbed. *The integrity of the lung in these places appeared to be unimpaired.* Inflation of the lung to extreme distension produced no visible alteration in the vesicles, although the experiment was several times repeated. One circumstance alone appeared to render it probable that the air might have come out of the lungs, and

that was, that, by pression, the vesicles could be rendered lax, although no air escaped externally.

Now, although these might have been cases of emphysema, certainly the interlobular extravasation was not present, neither were the subjects themselves broken-winded.

THE INTERLOBULAR OR TRUE EMPHYSEMA, Dr. Townsend informs us, "may be easily recognized in the dead body, by the transparency of the interlobular partitions, which contrast strongly with the dense structure of the intervening portions of parenchyma. Instead of the scarcely perceptible thinness which they exhibit in the normal state, these partitions, in a state of emphysema, are distended to the breadth of two or three lines, or even in some cases of an inch. They are generally widest at the surface of the lung, where the distension of their delicate cells bears an apt resemblance to a string of glass beads."—"When the disease continues to extend, the air passes from one interlobular partition to another, until it reaches the root of the lung, from whence it soon extends to the mediastinum, and thence spreads all over the trunk."—"Sometimes the air escapes into the cellular tissue which connects the pleura to the lung; forming bubbles of air, which may be pushed along the surface by the finger; by which circumstance they may be distinguished from the vesicles that are formed in *true* (?) pulmonary emphysema, as the latter are prevented from being displaced in this way by their interlobular partitions. Laennec explains this extravasation of air as dependent on rupture of air-cells: in most extensive cases of this disease, however, no such rupture has been detected; and rupture of cells constantly takes place without a particle of air getting into these partitions." This is the form of emphysema which we must continue to regard as inseparably connected with broken-wind: we have no fact before us to show that this has ever been observed in any but a broken-winded horse; although we appear to have evidence to prove that symptoms of broken-wind may exist, and yet the lungs be sound and free from emphysema.

Still, with Delafond, perhaps, shall we be justified in coming to the conclusion that, in three cases out of four, emphysema is to be found. And with this, let it be observed, it is very common to meet with thickening, or otherwise altered condition, of the membrane lining the air-passages. Indeed, Laennec has ingeniously shown how these morbid states are connected; an explanation which has been adopted by Delafond, though condemned by D'Arboval on account of broken-wind being proved to proceed from other causes.

ASTHMA and BROKEN-WIND have been compared, some regarding them as bearing "a close resemblance," while others maintain their identity cannot be established. It would be an easy matter to prove both parties either right or wrong, or, under varying circumstances, both right and wrong. The two disorders resemble each other in the circumstance of their proximate causes not being always the same; but they will be found very unlike in their symptoms and effects when their proximate causes are dissimilar; and yet extremely alike when those causes are identical, as the following account, extracted from Martinet's Pathology, will show:—

"EMPHYSEMA OF THE LUNGS (ASTHMA) is characterised by habitual dyspnœa, recurring by fits, which are exceedingly irregular in their periods of return and duration, and are subject to be increased by any cause, however slight, that affects the respiration. The movements of the thorax are irregular, and habitually unequal; *the inspiration is short, high, and rapid; but expiration is slow, incomplete, and as it were graduated: there is thus a manifest difference in the duration of the two movements.* During the fits the respiration becomes convulsive. On percussion the chest emits a sound more clear than in the healthy state; but this unnatural resonance is not given equally at all points, as the disease seldom extends to the whole lung. When the affection occurs at both sides, we experience much difficulty in estimating this increase of sound, as we have then no subject of comparison; and

again, when only one side is affected, there is another source of error: we may mistake the sound side, as being less sonorous, for the diseased one; but this is soon rectified by auscultation.

“*There is a constant cough returning in fits, usually dry, or accompanied by a viscid, transparent expectoration.* When the emphysema is of long standing and extensive, the intercostal spaces become expanded, and the thorax is rendered prominent, and rounded on one or both sides, according as the affection is single or double.

“In all the points occupied by the emphysema the murmur of respiration is very weak, or altogether suppressed. During full inspirations, and sometimes during expiration, we have a ‘*râle sibilant*,’ resembling the sound of a small valve, or a ‘*râle sonore*,’ imitating the cooing of a dove. The contrast between this marked resonance of the thorax, and the feebleness or total abstinence of the respiratory murmur, constitutes the distinctive character of this disease.”

Surely, these remarks are not only applicable, but cannot fail to prove of very great service to us in our examinations of cases of broken-wind, supposed to consist in emphysematous lungs.

ARE THERE OTHER PROXIMATE CAUSES OF BROKEN-WIND? We are hardly advanced enough in our inquiry to answer this question. French authorities give us *nervous influence*, *pulmonary inflammations*, *lesions of the heart*, and *lesions of the diaphragm*.

PROFESSOR SEWELL was of opinion that broken-wind consisted in structural or functional derangement, and consequent loss of power, of the muscular fibres traversing the trachea and encircling the bronchial tubes, in some portion or the whole of their course.

PROFESSOR DICK, in company with Mr. Hallen, V.S. 6th Dragoons, examined a mare after death who had for years been affected with broken-wind, and could discover *no apparent lesion* which could by possibility bear on the complaint. Was this *nervous* broken-wind?

Mr. GLOAG says: "In two cases of broken-wind which were destroyed for the profit of examination, after the most careful scrutiny, I did not detect emphysema." And in another instance—"the only anormal appearance I could discover was partial hepatisation of the right lung."

CAUSES.—"Why *horses* are especially liable to broken-wind," said Professor Coleman, "is, I think, to be accounted for by the fact that he is the only animal (probably?) which can be compelled to perform exertion on a full stomach; indeed, one of the most common causes is, riding or driving a horse hard who has previously drunk a large quantity of water. Being obliged to breathe quickly, and feeling some impediment in inspiration, he endeavours by a violent effort to remove it, in doing which the air-cells give way. It is a rare circumstance to see a post or coach horse broken-winded, unless so when purchased; and yet, neither of these horses go gently at first, and have their speed augmented as they proceed, as every horse ought to have; but, on the contrary, many of them are compelled to start and continue at the rate of ten or eleven miles an hour. You will naturally ask why such horses do not go broken-winded. The answer is, it is ascribable to the mode of feeding them. Each horse is probably allowed 20lbs. of oats a day, but not more than 5lbs. of hay; and again, they are not watered previous to their going to work. Such a mode of feeding is not only a palliation, but also a preventive of broken-wind. Farmers' and millers' horses are most disposed to this disease, because they feed them largely with hay and chaff and mealy food, which blows them out enormously, and then they are worked without discretion. The most effectual way of breaking a horse's wind would be, to procure a horse that was a great feeder—one that would consume about 35lbs. of hay in the course of the day; and, after having suffered him to eat as much as he chose—more especially if you were to put a little salt with it—and giving him as much water as he would drink, riding or driving him hard for two or three miles. I should not object to buying a horse as a hunter, myself, which was but *slightly* broken-

winded; since, by attention to feeding him, he might be got to do his work."

THE ORDINARY, IF NOT INVARIABLE PRECURSOR of the disease is *cough*. Nothing is more common than to hear connoisseurs observe that "such a horse has a *broken-winded cough*;" and too often this turns out to be a truthful prediction. The cough has that character in its low sound and imperfect development which seems to indicate want of power in the organs producing it. It is not quite a broken-winded cough, but has a great similitude thereto. The thickening so often observable in the bronchial membrane might give rise, if in an irritable condition, to cough; but it would not occasion a broken-winded cough. No: the probability is, the changes causing broken-wind are already beginning—there probably already exists *slight* or limited rupture of air-cell, the amplification or extension of which it is that becomes necessary to the full symptomatic development of the disease.

TURNING A HORSE OUT TO STRAW-YARD, where his keep consists of straw and rubbishing hay, is another alleged source of broken-wind,—a situation where he would not be able to break his wind in the manner described by Coleman. Having his water before him, he would not be likely to distend his body with drink; neither would he exert himself, or be likely to cause himself any pulmonary lesion. It is, therefore, difficult rather to explain this case, supposing all the circumstances be correctly stated. "Nimrod" (the late Mr. Apperley) has stated there are few or no broken-winded horses in France; and, on the authority of Mr. Gloag, I may add, that, in India, where the horses live on grass torn up by the roots, broken-wind is a disease hardly known. Mr. Gloag asks, "Was ever a case of broken-wind known among horses that had never left the grass-field?"

IT IS DIFFICULT OR IMPOSSIBLE TO RECONCILE THESE FACTS *as they stand*. Perhaps the surest way of coming to some understanding concerning them, is, to add as many more of any value as we are enabled to collect to

them. I believe, myself, that broken-wind is a much-less-frequently-met-with disease than formerly. I can avouch that it prevails little among military horses; its occurrence is not anything comparable to that of roaring. And it seems to be less prevalent among high than low bred horses. Coleman's theory accords with what is observed in human kind. Dr. Townsend informs us that "the great majority of cases (of interlobular emphysema) seem to result *from some sudden and violent effort of the respiratory muscles*, as in the forcing pains of child-birth, in raising heavy weights, in hooping-cough, &c." For the most part, broken-wind affects aged horses: rarely do we see it in young ones. D'Arboval says he never met with a case prior to the sixth year of age, and believes that mares are more disposed to it than horses. The following is a case of its occurrence early in life, as well as of its progressive development:

A gelding was passed by me at three years old, for my regiment, sound in every respect. The second winter afterwards he experienced an attack of chronic bronchitis, a prominent symptom of which was cough, which proved obstinate, and remained after all the other symptoms had disappeared. Although considered "cured," he was not suffered to do any work in consequence of the cough hanging about him. In the ensuing spring, during the blowing of a keen easterly wind, the cough became increased to that degree that I again submitted him to medical treatment. After a time, I perceived there was some agitation of the flanks, not of a character to denote anything like pneumonia, but such as evidently portended the approach of broken-wind. And what appeared to confirm this prognosis was, that his appetite and spirits continued undiminished, although his cough, which came on by fits, was now of that violent and convulsive character that it almost choked him, and withal so loud that it could be heard at a very considerable distance. By degrees, however, after a time, it became both less loud and less troublesome; and in the end degenerated into the feeble, short, husky, pathognomonic

cough of broken-wind; in which disease, at the expiration of a month from the commencement of the second attack, the case terminated. Ultimately, the horse was cast and sold, *broken-winded*.

CHANGES OF WEATHER have some such effect on the broken-winded horse as they have on the human asthmatic. During the fogs of autumn and the dry easterly winds of spring, and even in sultry summer weather, the animal's breathing is apt to be more disturbed, and his cough to be more troublesome, than at other times. I have seen broken-winded horses panting for breath in their stables under exacerbations of this kind; when, at another time, their respiration has been so tranquil, that, unless our attention had been drawn in an especial manner to them, we should hardly have suspected they were so disordered. Catching cold—the supervention of catarrhal disorder—will also induce an exacerbation.

SYMPTOMS.—There are two which in an especial manner characterise the disorder, and render it manifest to any person who has once paid attention to them; viz. the *respiration* and the *cough*. Expiration is an act tardy and protracted; inspiration, one facile and quick. Watch a broken-winded horse breathing. You will see the flank and posterior ribs, after being gradually drawn up, fall all at once, and with the belly quickly expand; but this act of expansion—inspiration—will be cut short by the subsidence of the parts once more; while the act of subsidence—expiration—will be followed up by one of contraction, by which the flanks and ribs will be forcibly drawn up again to their utmost. So that expiration is, in fact, a *double* action; the effect—as Mr. Blaine has happily explained it—of the muscular powers being called to the aid of the elastic or ordinary expiratory agents. The French have designated this peculiar flank-movement by the fantastical names of *coup de fouet*, *double tems*, *contre tems*, *soubrésaut*: we might fairly call it *jerking respiration*. Considering the lungs to be emphysematous—of which both D'Arboval and Delafond admit this kind of breathing to be pathognomonic—these

phenomena admit of ready pathological solution. The extravasated air is tardily and with difficulty forced back into its proper channels; to effect it, the lungs require additional and even supplementary compression: but, when once this has been accomplished, fresh air readily *rushes* in to occupy the vacuum, larger than ordinary, which is created by the dilatation of the chest. The *cough* is more than short; it is half suppressed or chopped off, as it were; and so feeble, that at any distance it is hardly audible: frequently, it is followed by a wheezing sound in the throat, and then puts one in mind of an asthmatic man. At the beginning of the disease—and indeed on certain occasions afterwards—cough is apt to be very troublesome; to come on in fits, particularly during exercise, or after drinking. When the disease is once established, and there exists no particular excitement, the cough is *solitary*, as well as short and feeble, *i. e.*, the horse coughs but once at a time.¹—*Indigestion*, also, is a prominent symptom. The horse has a voracious appetite, and yet is in lean condition. Though a voracious feeder, he is nothing but an ill-conditioned hide-bound looking animal.¹ And well he may be; for if we examine his dung we shall find it looking like so much chopped hay, mingled with oats and husks, altogether evincing a most imperfect digestion. Out of this likewise arises that remarkable *flatulence* of bowel which is the occasion of the tumid, tense, tympanitic belly, frequently pendent from weakness, and which is, moreover, often so annoying in another way—one from whence, as I said before, the disorder appears to have derived its name. When the horse is first taken out of his stable and put to exercise or work, the ejection of wind, simultaneous with every effort he makes, or even with his cough, together with the occasional voidance of fæces, is in some cases very offensive: it, however, affords him relief in his breathing, by making room for the recession of the diaphragm, and to the degree that, after he has once “emptied himself,” he will work on with very little inconvenience to himself or annoyance to his master.

¹ Vide Gloag's ‘Thoughts on Broken-Wind,’ in ‘The Veterinarian’ for 1852.

All this is owing to the increased power the expiratory muscles—the same as are employed in discharging the fæces—obtain over the retaining power, or *sphincter ani*. And in inveterate cases, so violent and frequent is the employment of this supplemental power, that the sphincter at length becomes, from continual forced dilatation, weakened to that degree that the anus is seen as often open as shut; nay, sometimes dilated to an enormous extent, exposing to view the interior of the bowel; the anus itself, from loss of power, advancing and receding with every expiration and inspiration the horse makes.—The *skin* also indicates the failure of the digestive powers: it becomes harsh and dry, perhaps hidebound; the coat likewise grows long and rough, and pen-feathered; all adding to the generally unhealthy aspect of the animal.—“When one lung only is emphysematous, or is much more emphysematous than the other, the intercostal spaces become wider, and it yields a clearer sound on percussion. If both sides are affected equally, the whole chest yields a very distinct sound, and exhibits a round globular outline, swelling out on both sides; and this conformation is so remarkable as to render the existence of emphysema evident from simple inspection.”¹ Will this observation, concerning the altered form of the chest, not apply to horses?

AFTER THE FULLEST INVESTIGATION of the subject, practically, and after consulting all the best veterinary authorities, both British and Continental, I must confess myself forced to come to the conclusion, to counsel my reader still to adhere to the theory, that *emphysema of the lung* is the pathology of *true* broken-wind, and that the emphysema is of the *interlobular* description. To what extent horses are liable to that spurious form of emphysema, called *vesicular*, which consists in *dilatation* only of the air-cells, and how far the same may tend to induce broken-wind, I am not at present, myself, prepared to say: I can only repeat, that Delafond includes both kinds of emphysema in his proximate causes of the disease. That gross and irregular feeding,

¹ Townsend's 'Account of Emphysema in Man.'

violent exercise on a full stomach, with chronic bronchial irritation as well perhaps, are the common fore-runners and producers of this emphysematous condition of lung, there can be no doubt; and I look upon Laennec's explanation¹—since adopted by Delafond—of the manner in which bronchitis leads to emphysema, although it is ridiculed by D'Arboval, as the most plausible theory we yet have on this part of our subject. I also believe that the indigestion, so common an attendant on the disease, may precede it, and prove the origin of it. In regard to broken-wind arising from other causes, I am of opinion that a disorder analogous to it—perhaps indistinguishable from it—does on occasions present itself, though, in the end, this may not turn out to be what we have been in the habit of regarding as genuine broken-wind: there will not, I apprehend, be found to be in its origin, course, and termination, *precisely* the same series of phenomena; notwithstanding, I repeat, the symptoms may be so similar, that, by our ordinary tests of observation, we fail to make out satisfactory differences between them. The time seems fast approaching when we shall be enabled to diagnosticate in the living animal between emphysema of the lungs and rupture of the diaphragm, and other lesions whose symptoms simulate those of broken-wind; and then—but not till then—shall we all come to some unanimous opinion touching the pathology of the latter.

BY PERCUSSION AND AUSCULTATION we may, probably, be enabled to achieve this great desideratum. According to Delafond, "The pathognomonic signs of pulmonary emphysema are, 1st. The interrupted respiration; weak respiratory murmur; loud resonance of the thoracic parietes; rubbing sound; sibilous and crepitous râles. 2dly. The simultaneous existence of all these symptoms in many parts of the lung indicates general vesicular dilatation and interlobular emphysema. 3dly. Weak respiratory murmur during expiration, rubbing sound during inspiration, anormal resonance of both sides of the chest, are more especially the signs of simple vesicular dilatation, confined to the anterior

¹ Given at page 169.

lobes, or of dilatation throughout the pulmonary tissue. 4thly. The dry crepitous and dry sibilous râles, deeply interrupted respiration, very loud resonance, and extreme dyspnœa during exercise, are the especial indications of interlobular emphysema. 5thly and lastly. The presence of dry crepitous râle and loud resonance, located in one or more parts of the lung, announce local vesicular dilatation in those places."

TREATMENT.—No disease more completely evinces the revolution science has effected in veterinary medicine than broken-wind. Our professional forefathers, mistaking the effect for the cause, conceived the disease to consist in distension of the bowels with air, and thought that, by affording additional facility for the emission of this, they cured or palliated the complaint. Accordingly, what did they do?—nothing less, as we have already seen in Coleman's account, than absolutely make an artificial anus for the more free escape of this redundance of wind. In the operation the sphincter ani sometimes got divided; and the poor animal, unable to close his fundament, became ever afterwards a most loathsome spectacle, and but too convincing and disgusting a proof of the ignorance and barbarity of his medical attendant.

BROKEN-WIND IS ITSELF AN INCURABLE DISEASE. Notwithstanding, it is one whose effects in most cases admit of palliation, and generally in two ways:—either by administering to the complaint itself, or by putting the bowels into that state most favorable to the animal's breathing. I shall therefore consider the treatment under two heads, —*medical* and *dietetic*.

MEDICAL TREATMENT will be required at such times as a paroxysm happens to be induced by any concomitant catarrhal or febrile affection. Bloodletting to a small amount may be advisable in cases in which any congestion or inflammatory action prevails in the lungs. In cases where there is more local than general irritation, and when the animal can afford to lose a little blood, we may try what the French veterinarians recommend,—opening the spur-

vein. Aperient medicine—small doses of aloes, also *enemata*, always prove serviceable. Should there be any flux from the nose, encourage it by steaming the nostrils, provided the animal can bear it without becoming harassed in his breathing. After the bowels have been opened, I would administer some sedative or alterative. *Digitalis* has been found effective in temporarily quieting the respiration: indeed, so tranquil does the breathing become in some cases under its influence, that the horse appears as though he had got quite rid of his disorder. With the cessation of action of the remedy, however, his symptoms all return. The French give opium with the same intention. Where any bronchitic irritation or disease was present, and the horse could be laid up for awhile, the best medicine would be the Plummer's ball,¹ once or twice a day.

DIETETIC.—Solleysel is said to have cured a broken-winded horse by confining him for eight days in a barn with plenty of hay, but without water or drink of any kind. In modern times, these experiments have been repeated by Rodet.

He shut up a sound-constituted glandered horse, who had become broken-winded, and gave him hay only, depriving him of all drink. He was fat in condition, winter-coated, his pulse was 36, and his inspirations twelve a minute. The first three days he did not appear to suffer much, notwithstanding he became hollow in the flanks, and tucked up. The fourth day he sought everywhere for water, licked the hands and clothes of his attendants, gaped often, and was unusually lively. Though the pulse and respiration remained unaffected, the animal began to fall away, and his coat commenced coming off. On the fifth day, whenever he moved, his joints cracked, a symptom which continued increasing afterwards. His flanks were now quite drawn up; his appetite failed him, the pulse continued 36, but the inspirations sank as low as eight a minute. The mucous membranes were reddened and injected, and there was a flux from the left nostril which continued

¹ For the recipe for this ball, see p. 99.

augmenting to the last; but there was a strange diminution in the swollen gland, and which became afterwards still more striking. On the sixth day, still losing flesh. Eighth day, the gland ceased to diminish; the horse dejected, and looking thinner; was very weak, had left off eating, and no longer lay down; nasal flux abundant, and sticking about the nostrils. Tenth day, six inspirations and thirty-six pulsations a minute. The horse staggered in walking, and refused to eat. Seeing that he could not in this state long survive, water was brought. He drank, and immediately recovered his appetite. He regained his *embonpoint* with the same rapidity with which he had lost it. For some days afterwards the nasal flux had much diminished, together with the inflammatory action, and the movements of the flanks had lost their *soubresaut*. But in four days more, all the symptoms of broken-wind had returned. The horse was destroyed, and his lungs showed general emphysema.

By PROPER FEEDING, and *by condition*, it is that we render our broken-winded servant, while free from exacerbation, of the greatest service to us. By a judicious plan of regimen, in respect to exercise or work, and feeding and grooming, the animal must be got into the best possible condition. All his grossness, all redundant fat about his body and bowels, must be got rid of, so that nothing remains but sheer hard muscle; and when this—which is real *condition*—shall be attained, the horse—be he broken-winded, or roarer, or otherwise defective in his “pipes”—will do his work with so much comparative facility and comfort as no longer to appear like the same animal. The air of his stable should be temperate and pure. His food should be of that kind which will not greatly distend his bowels or be hard of digestion, or prove astringent in effect; at the same time it must be nutritive, and such as he can work upon. Take great care that he do not over-fill his stomach, and that he get no water to distend his bowels; none, at least, on the eve of his being required for work; but only sufficient water and food to maintain his powers, and these given some two or three hours before his work is likely to commence. The

object of all this is, that his respiratory powers—above all, his *diaphragm*—may play as unencumbered as possible; while, at the same time, his body is lightened, and his stamina supported. Give him a peck and a half of oats a day, and not more than six or seven pounds of hay, and let that be moistened with water, and be of the best upland quality—no clover, nor sainfoin, nor lucern hay, nor, in fact, any gross and filling rack-meat—and let him have his hay *after* he has done his work, and, for the most part, his water too. Beans are good for him; and so are carrots and turnips. Yet has it often been remarked, how well broken-winded horses work when fed on green food, even of almost any description—vetches, clover, lucern, &c.; which at first appears like a paradox to the above: but, no!—this arises from the easily digestible and laxative properties of the recent vegetable, insomuch that it remains but a short time within the stomach, and is, during any bodily exertion, speedily ejected out of the bowels. It must be borne in mind, however, that green food would not be admissible to a horse required to be kept in *hard* condition. To horses much troubled with flatulence, and who, from the appearance and offensiveness of their dung, are evidently the subjects of indigestion, I know of no food that in general seems so suitable as carrots: other roots—such as Swedish and common turnips, potatoes, and mangel wurzel—may likewise be given, and it will be found, I have understood, a great improvement to boil or steam them first. Finally, let the pace be slow and moderate at the beginning: by degrees, as the horse empties himself, it may be increased, in which manner are the animal's fullest powers, with least embarrassment, called forth. Exercise or work of some sort is so important that it cannot be remitted for a single day without his food filling and so harassing the broken-winded horse.

NIMROD informs us that, in the stables of the fast coaches, horses are only allowed half a truss of hay (28 lbs.) each for seven days,—but that they get a bushel and a half of corn (about 60 lbs.) each, besides;—and that a broken-winded horse is now scarcely heard of among them. “I

have taken some pains," continues Nimrod, "to ascertain this fact by my own personal inquiries. One proprietor, who has nearly fifty horses at work—many of which are in as fast coaches as any that travel on the road—assured me, lately, that he had not a broken-winded horse in his yard; whereas, before he stinted them in their hay, he generally had *one in five* in that state."

WHY CANNOT WE CURE BROKEN-WIND? This question is extremely likely to be put to us—and by *surgeons*, too; for Laennec says, interlobular emphysema is curable—he has seen "several recoveries from it." And Dr. Budd, who presented a paper to the Medical and Chirurgical Society on *Vesicular Emphysema*, says, in regard to the *interlobular*, that it is the result of an accident—rupture of the air-cells—most commonly caused by deep and rapid inspiration, "and which is, generally, *a very trifling injury*." And, again, Dr. Townsend's words on the same part of our subject are—"fortunately, however, the diagnosis is not a matter of much practical importance, as in slighter cases (in which alone any ambiguity can exist) *the air appears to be always absorbed, and the interlobular partitions gradually return to their natural state*."

There surely must be some mistake about this lesion. Either we must be terribly out in our pathology, or these medical philosophers must be in error. The difference of the animals never can make this difference in results, the causes being admitted to be similar. We have no notion of the "absorption of air," and "the parts gradually returning to their natural state." With us it is, once broken-winded, for ever broken-winded. Delafond, indeed, speaks of the *possibility* of cicatrisation of the torn air-cells, in cases where they have been ruptured by violence, through rest and depletive measures; but he adduces no fact or case to make us believe it possible; nor, for my own part, have I ever witnessed or heard of such a thing.

SPASM OF THE DIAPHRAGM.

If I mistake not, our attention was first called to this subject by the celebrated Nimrod, the late Mr. Apperley. In his admirable 'Letters on Condition,' so long ago as the year 1825, he remarks, while discoursing of treatment after a hard and long run,—“When a horse is very much exhausted after a long race with hounds, a noise will sometimes be heard to proceed from his inside, which is often erroneously supposed to be the beating of his heart, *whereas it proceeds from the excessive motion of the abdominal muscles.*” This interpretation of the “noise” was shortly afterwards disputed by Mr. Smith, of Woodhouse, who ascribed it *to the heart*. In a subsequent letter, however, Mr. Apperley, having in the interval met with another case, argues that the noise, from the situation in which it is heard, cannot possibly proceed from the heart, unless, indeed, as he adds, “the heart lay where it should not lie;” but—repeating his former opinion—is caused by “a convulsive action of the abdominal muscles.”

In 1831, Mr. CASTLEY, with his mind directed to the subject by the foregoing observations of Mr. Apperley, sent a paper to THE VETERINARIAN, wherein, although he had never seen but one “well-marked instance of it,” he appears to have hit upon the true explication of the phenomenon; which is, that the “noise in the inside” is owing to “spasmodic affection of the diaphragm.” In Mr. Castley’s case, the prominent symptom was “a convulsive motion or jerking of the whole body, accompanied by a dull thumping noise, audible at several yards distance, and evidently proceeding from his inside. The beats appeared to be about forty a minute. On placing my hand over the heart, the action of that organ could be felt but very indistinctly: the beating evidently came from *behind* the heart, and was plainly to be felt in the direction of the diaphragm. Again, placing my hand upon the abdominal muscles, the jerks appeared to come from before backwards. There was no pulsation to be felt at the submaxillary artery.”

Mr. BROWN, V.S., Melton Mowbray, in 1833, published three "well-marked cases" of it. The first was that of a young mare taken up from grass and driven slowly thirty-five miles in one day, with a stomach filled with three pecks of oats. The second, that of a horse who "had been living in a state of rest for some time, and was forced to sudden and violent exertion with his stomach full of grass." The third had not undergone any exertion, save that of "rolling and pawing" from an attack of gripes. Mr. Brown referred them all to "spasmodic action of the diaphragm."

To Mr. SINCLAIR,¹ V.S., Morpeth, spasms of the diaphragm occurred in a case of trismus. "There was a loud beating in the region of the diaphragm, which could be heard at a distance of ten yards, and not synchronous with the pulse." It was "accompanied with distressing cough and profuse perspiration." The case did well, treated by opium and digitalis, and keeping the bowels open.

Mr. TOMBS,² V.S., Pershore, saw a five-year-old mare, who for some days had been out at grass, that became suddenly seized with quick and laborious respiration, quick pulse, and shivering, which symptoms were treated by venesection and an aperient. "In the evening, violent palpitations of the diaphragm came on, which was discovered by a tremendous and loud noise inside the ribs, as though a man was in the thorax beating the ribs with a hammer: the noise proceeded principally from the left side, midway between the spine of the back and the ninth rib. Pulse almost imperceptible." Venesection and opium, and stimulating liniment to the side and extremities, with aperients, perfectly cured the case.

Mr. GUTTERIDGE,³ V.S., Carmarthen, was called to a mare who, on her arrival in the Gloucester mail, showed great uneasiness, frequently attempting to stale; pulse 90; "and there was a violent beating on the near side, which could be heard at a considerable distance. Her side was much convulsed; and, on placing my hand over her heart,

¹ 'The Veterinarian' for 1835.

² Ibid., 1835.

³ Ibid., 1836.

its action could not be clearly felt.” Venesection—which it became necessary to repeat—aperient medicines and opiates, recovered her.

The SYMPTOMS, collected from the foregoing cases, are—violent palpitations against the ribs, loud enough to be heard at a distance of some yards, producing a convulsive motion or jerking of the whole body, unconnected with the pulsation of the heart, sounding posterior to that organ, in the region of the diaphragm. Indeed, the pulse at the heart is rarely perceptible, nor is it often to be distinctly felt at the jaw. The horse is in great distress for breath. From time to time he breaks into a profuse sweat; and, in some cases, a harassing cough is an accompaniment.

CAUSES.—Over-fatigue and exhaustion, especially of the kind caused by hunting or hard work, on a full stomach. In some instances it has come on at, or after being at, grass. In one case it proved an attendant on locked jaw.

PATHOLOGY.—That the *seat* of the disorder is the diaphragm, both its locality and peculiarity of symptom appears to render highly probable; while that the affection is in its nature “spasmodic,” I think is forcibly argued, as well from the character of the symptoms, as from the sudden manner in which the disease attacks and quits the patient. After all, however, it appears, Mr. Apperley was not running into vast pathological error when he pronounced the disorder to be in the abdominal muscles. For, supposing the diaphragm to be in a state of spasm or convulsion, how could the breathing be carried on if it were not for “the excessive motion of the abdominal muscles?” Upon the action of the diaphragm, ordinary tranquil respiration almost entirely depends; and when this agent is incapacitated or deranged, but for those necessary and powerful auxiliaries—the abdominal muscles—the breathing must become suspended, and the animal die. The “distress” of the patient is occasioned by this dread of suspension; “the jerkings of his body,” by the efforts he is making with his abdominal auxiliary powers to counteract it. We know that one of the ordinary causes of spasm is over-action; we need, therefore,

feel no surprise that spasm should seize the diaphragm after such labour as that muscle must have been performing during a severe run with hounds. Mr. Brown's and Mr. Tombs' cases show that it may supervene upon colic, and upon certain states of the stomach and bowels produced by green diet. In conclusion, the spasm may prove the result of inflammation of the diaphragm.

The TREATMENT to be pursued must be entirely regulated by the nature of the case. Should the case be one of the "over-marked" description, and there be signs of exhaustion and decline of the vital powers, we ought to combine stimulants with our antispasmodics. Incomparably the best antispasmodic is opium; we should therefore give, immediately, either the following ball or the drench:—

R Opii	ʒj	R Opii Tinctur.	ʒj
Ammonia sub-carbonat.	ʒiiss	Spirit. Æther. Nitric.	ʒij
Pulv. Anis.	ʒiiss	Aquæ Tepid.	ʒj
Syrup. Zingiberis, q. s. M. et Bol.		M. fiat Haust.	

In such a case as this, after re-action appears to have taken place, should the spasm continue, bloodletting can be practised only to save life, should it ever seem requisite; but in a case where exhaustion is not present, blood may be drawn, and the sedative medicine—the opium—either with or without the ammonia and æther, given at the same time. Warm clysters ought to be resorted to; and, could it be had, a warm bath would be likely to afford great relief. Should the case appear to be anywise connected with colic, I would, above all medicines, give the gripe aperient drench, thus composed:

R Decoct. Aloës	ʒj
Tinct. Opii	ʒij
Spiritus Æther. Sulphuric.	ʒiv
M. fiat Haust.	

This drench must not be repeated. Let either the antispasmodic ball or drench be given a second or even a third time, if required, at intervals of three or four hours; care being taken to keep the bowels soluble by injections.

RUPTURE OF THE DIAPHRAGM.

It is not many years since this lesion was added to our nosology. For calling his attention to it, as well as for showing its connection, in similarity of symptoms at least, with broken-wind, I believe the veterinary surgeon to be indebted to an estimable, now deceased, friend of mine, Mr. Thomas King, late surgeon at Barnstaple; with whom, while dressing for Mr. Travers at St. Thomas's Hospital, I had the good fortune to become very intimately associated. Shortly after leaving the hospital for private practice—having while there, as it would appear from his acquaintance with me, imbibed a taste and liking for veterinary pursuits—Mr. King sent me, I think it was in the year 1825, the following communication, which I, three years afterwards, published in one of the earliest Numbers¹ of *THE VETERINARIAN*: in fact, almost immediately after I had originated that Journal.

“A little mare of my father's was many years since ridden rather sharply for half a dozen miles. This was in summer; consequently she was in all probability full of grass. Be that as it may, she soon after exhibited the symptoms of broken-wind. At length, she died rather suddenly, whilst standing in the stable. I ought to have mentioned that the cough was the most curious apology for a cough you ever heard: it resembled nothing so much as the short breathing of a child under pulmonary inflammation. On examination, it was found that the diaphragm was lacerated on the left side through its whole extent, throwing the two cavities into one. The laceration appeared recent; but I should think it must have been in part old: what should you say? The lungs were dark-coloured and collapsed; the edge of each lobe to such a degree that those parts were not inflatable, though air could be made to pass when they were cut through. No air underneath the pleura pulmonalis. Heart and large vessels quite healthy. Posterior surface of the diaphragm on the left side showed

¹ In vol. i, page 101.

signs of former inflammation : its peritoneal covering had become altered in texture, and was here and there studded with coagulable lymph. The examination was made by my father.¹ I wrote him a long list of observations on the case ; but I shall not send you any until I have heard what you have to say : so remit me your thoughts on the subject."

In the same volume will be found three other cases, all furnished by that ever observant and communicative practitioner, Mr. Cartwright : before I notice these, however, I must give the particulars of one that occurred to Mr. Hayes, V.S., Rochdale, which—though curious altogether—possesses some characters corroboratory of the suggestions prompted by Mr. King's case.

A horse experienced an attack, while at grass, partaking of the nature of jaundice, which was subdued by bloodletting, and aperient and sedative medicine. Being recovered, he was ridden for a week, and then turned to grass again : it occurring in the month of August. Nine days afterwards, the animal's services being again required, he was taken up, and found broken-winded. Notwithstanding this, he was ridden for three weeks more, and then again was taken ill with "marked anomalous symptoms of pleuritis and enteritis." In five days he was again quite recovered, and was once more ridden. His owner, however, by the advice of a blacksmith, now gave him an ounce of saltpetre, night and morning, to cure his broken-wind. This produced acute inflammation of the neck of the bladder, of which he died. On examining him, the lungs appeared sound. A portion of cæcum had protruded through a rupture in the diaphragm ; forming a pouch within the chest, which had also become ruptured, and suffered its contents to escape within the thoracic cavity. The rupture in the diaphragm was near its inferior part, about five inches above the middle of the sternum ; and was two and a half inches in extent, with its edges sloughed off—quite smooth and circular. The liver was gangrenous. All the guts highly inflamed.

¹ Who is also a surgeon.

The stomach almost black. The bladder, including its neck and urethra, all gangrenous. Small calculi within the neck of the bladder. Notwithstanding all this disease of the viscera, the horse continued to eat during the intervals of cessation from pain, which lasted about ten minutes each time; though these were followed by fits of extreme agony of half an hour's duration and upwards.

A case similar to the foregoing has recently occurred in my own practice: it will be found in vol. xxvi of *THE VETERINARIAN*, April, 1853. A troop horse was brought to me for having hurt himself "behind," by—it was reported—"falling down in his sleep:" a story I did not believe. I heard afterwards, he had slipped up at the Horse Guards. The horse showed no other symptom save that of dragging lameness of his hind parts, which afterwards became excessive. Ten days succeeding his hurt, while under treatment for it, the old horse was seized with "gripes," which resisted all remedy, and caused his death in seven hours. The diaphragm was found ruptured; and through the rent had passed, into the thorax, the stomach and part of the duodenum, causing *hernia* besides. The stomach was distended, and had at its fundus burst. The duodenum was, by being displaced, twisted. For full particulars the *Journal* can be consulted. M. Langwvard also reports a case of strangulated inguinal hernia, in which, after death, was discovered a rupture of the diaphragm.

The nature of Mr. Cartwright's cases may be gathered from the observations he has appended to them, which run as follow:

"The mare—the first case—had been most severely worked for the last four or five months, and, lately, whilst labouring under considerable catarrh. Her owner was in the habit of knocking and kicking his horses about, and driving occasionally at a greater rate than their strength admitted of, and it is probable that her rib—which after death was found fractured—was broken by such ill-usage, and that peritonitis likewise was brought on by her being kicked in the abdomen. Over-exertion and her excessive

coughing had caused partial rupture of the diaphragm, which was completed on the day she was exercised, or soon after."

"The second case I attribute to excessive and repeated coughing; for the fibres of the diaphragm in each case seemed as if they were drawn from each other, being tapered out at their edges to the mere thickness of a wafer."

To these two cases Mr. Cartwright adds a third, in which rupture of the diaphragm appeared to have been caused by parturition, happening in a broken-winded mare, while at pasture, and at a time when her bowels were distended with green food and flatus.

THE NEXT COMMUNICATION on the subject comes from the pen of Mr. Hales, V.S., Oswestry; and it will be found a valuable one, not only for the sensible remarks by which it is accompanied, but on account of its teaching us a new fact—that it is possible for the diaphragm to become "extensively and fatally ruptured by its own vehement muscular contractions, in a horse previously in perfect health."

During the unparalleled hot weather of July, 1825, a four-year-old mare was put to a carriage, with three others, to go, post, from Oswestry to Shrewsbury—eighteen miles. In general she was led in hand; but this day one of the postilions—about twelve stone—rode her, and they went a quick pace. After doing this, she was put to work another carriage back to Oswestry. She reached within a mile and a half of her journey's end, and then became so much distressed, that she was taken out of harness, and with difficulty got to her stable. Mr. Hales being from home, an hour elapsed before he saw her. "She was breathing with great difficulty—not in that short quick way that characterises inflammation of the lungs, but each respiration was produced with great effort, like a person labouring under a severe fit of convulsive asthma." "I am free to confess," continues Mr. Hales, "that the peculiarity of the breathing both surprised and puzzled me, as I had never seen anything like it in the horse before, nor have I since; but, knowing

that the mare had undergone dreadful fatigue, it was set down as a case of exhaustion, or *over-marking*, as sportsmen term it." In half an hour she died. There was a rent in the diaphragm, extending from the ensiform cartilage to the perforation through its tendinous portion for the vena cava. The lungs and other viscera were sound. Neither stomach nor intestines were found loaded with food. Another practitioner of the town related a similar case to Mr. Hales.

MR. CARTWRIGHT MENTIONS AN ANALOGOUS INSTANCE.—A coach-horse, twelve years old, dropped down dead, going at the rate of ten miles an hour. "The rupture (in the diaphragm) was so large that a man's head could easily pass through it, and was near the ensiform cartilage, extending as much on one side as on the other. It was the muscular part, and some part of the muscle seemed to be torn from the tendinous portion. It was evidently a recent affair, as there was not the least disease about it."

Pursuing our inquiries on this interesting and comparatively novel subject, we come to a case narrated by Mr. Price, V.S., Rochester:

It was "a noble-chested cart-horse, aged, very free in his work, and the day never too long for him." He had continued working with a severe cough for a fortnight, his appetite being good; but at length was taken "seriously ill." A smith was then sent for, who took away five quarts of blood; and, next day, the same quantity. On the third day Mr. Price was called in, who "found respiration extremely laborious, and the animal showing great uneasiness by incessantly moving about; pulse 50, and hard." Next morning the pulse was 90, and soft; and the respiration still more difficult, which, observes Mr. Price, "I should have thought impossible, had I not seen it; the animal being considerably tucked up in the flanks, and showing altogether great distress." Mr. Price bled: the blood was "very dark, and without any separation of its constituent parts." The horse died on the seventh day. The diaphragm was found "ruptured on the near side, as large as a crown-piece: its anterior surface presented one mass of inflammation, and

might be considered in a gangrenous state. It was so rotten, that it came off in bits between the finger and thumb. The lungs were perfectly collapsed, but otherwise healthy," as were likewise all the abdominal viscera.

THE THROES OCCASIONED BY DIFFICULT PARTURITION may end in rupture of the diaphragm. Mr. Thomson relates a case of this description,¹ in which the muscle was discovered "ruptured almost from side to side, *across* its fibres."

RUPTURE OF THE DIAPHRAGM AFTER DEATH.—On French authority,² I am now going to report two cases which would appear to establish this among other facts connected with our present investigation.

A coach-horse ran his chest against the pole of a carriage, fractured two of his ribs, and opened the intercostal arteries, from which blood poured into the correspondent side: death ensued twelve hours afterwards. He did not manifest after the accident, or, indeed, had he at any previous time shown, anything symptomatic of ruptured diaphragm. His carcass was examined fifteen hours after death. The belly was then exceedingly distended. The diaphragm was found ruptured on the right side through its upper part, not far from its tendon; the laceration was very irregular, and measured four inches in length. The arch of the colon completely closed the breach. The fibres of the muscles were corrugated and collected into parcels. The colour of the lacerated fibres was the same as the rest of the muscle—a livid deathlike hue; their edges were nowise tumefied. Not a streak of blood appeared upon them, nor was a drop effused into the abdomen.

An adroit and experienced horse-gelder had a young horse die suddenly after the removal of the first testicle. He sent to the Lyons Veterinary School for assistance, and some pupils went and examined the carcass. Although the horse had been dead but twelve hours, the belly was found exceedingly distended. They found the stomach ruptured towards

¹ 'The Veterinarian' for 1835.

² 'Report of the Proceedings of the Royal Veterinary School at Lyons,' during 1831.

its left curvature, and the diaphragm lacerated through the fleshy part of its right side. The diaphragmatic lesion had given vent to no hemorrhage, nor were the lacerated edges at all tumid. The divided fibres were irregular, collected into unequal parcels, and their colour the same as that of the other parts.

I leave these cases to the consideration of my reader and the test of future observation. Whether they be or be not proofs sufficient of the fact they are intended to demonstrate, they have at least this value: they will serve to caution us against hasty and inconsiderate decisions on occasions when we meet with rupture of the diaphragm in the *dead* body, and are not altogether satisfied about the symptoms during life having been such as to indicate it.

The DEDUCTIONS to be drawn from the foregoing and other analogous cases, are, that rupture of the diaphragm is by no means unlikely to follow acts of extraordinary exertion, efforts of any kind, and particularly upon a full stomach, or rather when the bowels are distended with green or other food likely to generate gas. A fast gallop, straining draught, a heavy fall or blow upon the side, violent fits of coughing, even the throes of parturition, have all proved the occasion of it. The diaphragm, being in itself the ordinary and principal respiratory agent, any act said to "break the wind" of a horse, seems quite as likely to produce laceration of *it* as rupture of the air-cells; a circumstance which, connected with the resemblance in the symptoms of the two lesions, will very well account for such cases of broken-wind as are said to consist in ruptured diaphragm; though, in truth, they are not broken-wind: at least not the disease which in our pathology answers to that name. While the whole body is in action or convulsed, the diaphragm, as D'Arboval has pertinently observed, becomes the *point d'appui* of the muscular system, in which state of contractile resistance, its fibres must especially be liable to be rent. Coupled with these causes of rupture, we must not forget what has been known to happen—and what may often happen in such cases—after death, when,

from *post-mortem* gaseous emissions, the bowels become distended and forced against the diaphragm and abdominal parietes to a degree to threaten bursting. I have seen the recti muscles split and torn in this manner, as well as the fasciculi of the diaphragm; and therefore, I repeat, it requires, in this tympanitic state of the dead body, extreme caution in pronouncing upon such lesions.

SYMPTOMS.—Cases have occurred in which nothing has appeared to indicate disorder, and yet after death the diaphragm has been discovered, ruptured. Other cases have manifested such extraordinary agitation in the breathing that the disease has appeared at once distinguished from all others. This incongruity, probably, is to be accounted for by the nature, direction, and extent of the lesion in the muscle. On occasions, the disorder has so resembled broken-wind that very good veterinarians have mistaken it for that disease: hence one reason for the discrepancy of opinion concerning the pathology of the latter. The respiration and cough must furnish us with the main clue to the lesion: and should symptoms of colic be present as well, we may suspect that some abdominal viscus—intestine or omentum, or even liver—has got into the rent in the diaphragm. Should it become strangulated there, it will probably give rise to symptoms such as indicate strangulated hernia elsewhere.

The **LESION**, or rupture in the diaphragm, may occur either in its fleshy or its tendinous portion: the former appears to have been the most frequent seat of it, and in particular in the vicinity of the ensiform cartilage. In one case the muscle was split quite across. Tumefaction, reddening, infiltration of the lacerated edges, indicate that the lesion is a recent one; absence of these signs, together with smoothness and roundness of them, show that it is of some standing. Jagged, bloody, unchanged edges, with considerable distension of the abdominal viscera and parietes, and this latter having taken place in the interval between death and examination, will render it probable that the rupture has happened *post-mortem*.

THE RELATION TO BROKEN-WIND which this lesion bears,

is of great importance to us—not that we have any power to remedy one more than the other, but—that we may be enabled to establish such a diagnosis between them as shall guard us from mistaking two pathological conditions so totally different in nature from each other as rupture of the air-cells and rupture of the diaphragm. There can be no doubt but that they have been too often confounded, and hence one reason for the discrepancy of opinion concerning the nature of broken-wind. The principal diagnostics must be, the respiration and cough : at the same time, every other collateral inquiry should be instituted likely to throw light upon the case. Should colicky or hernial symptoms supervene, its nature will admit of little doubt.

SECTION VIII.

DISEASES OF THE HEART, PERICARDIUM, AND
GREAT BLOOD-VESSELS.*General Observations on the Action of the Heart.*

PERICARDITIS.	OSSIFICATION OF THE HEART.
HYDROPS PERICARDII.	AIR IN THE HEART.
RUPTURE OF THE PERICARDIUM.	RUPTURE OF THE HEART.
CARDITIS.	POLYPUS OF THE HEART.
ENDOCARDITIS.	TUMOUR OF THE HEART.
DISEASE OF THE VALVES.	ANEURISM OF THE AORTA.
ENLARGEMENT OF THE HEART.	ANEURISM OF THE ILIAC ARTERY
HYPERTROPHY.	ANEURISM OF THE RENAL AR-
DILATATION.	TERY.

THE class of diseases we are now about to consider may be regarded as the least advanced of any of veterinary medicine,—a circumstance not to be ascribed so much to their comparative rarity as to their existing undiscovered, or rather, being confounded during life with other diseases, and in particular with pulmonary affections, with which they will be found in practice often to be combined. Indeed, it is only within the present century that even surgeons have been able to boast of much knowledge in this branch of nosology. Antecedent to the time of Laennec, cardiac disease in man was but seldom detected—if discovered at all—until that stage of the malady was passed when remedy might or could have proved effectual: to auscultation it is that surgeons stand principally indebted for enabling them to make out disease of the heart, especially in its primary and incipient form; and to the same influential auxiliary must veterinary surgeons have recourse if they would aspire to anything approaching the same perfection of art.¹ In our own days, as authors who

¹ "In heart disease, although we dare not speak with certainty without the aid of auscultation, a tolerably accurate diagnosis may nevertheless be made from the careful investigation of symptoms."—*Todd on 'Diagnosis,' Lancet*, Oct. 29 1842.

have taken great pains to investigate the subject, both by experiment and practice, stand eminently the names of Williams, Elliotson, Hope, Stokes, Watson, and Latham in our own country; to which distinguished list we may add those of the foreigners—Louis, Andral, Corrigan, and Bouillaud. Dr. Hope, whose labours have not only greatly augmented the previous small stock of knowledge existing, but have been attended with the important results of correcting errors concerning the action of the heart, into some of which even Laennec had fallen, and which, through his great authority, had become extensively propagated and believed.

In order that we may be able to recognise and appreciate the sounds and sensations conveyed to the hand or ear by the action of the heart under disease, it will be necessary for us to make ourselves acquainted with those indications of its movements in a state of health, it being by comparison of the two that we shall best in the living body discriminate between the normal and anormal condition of the organ. By the hand applied flat against the ribs of the left side, immediately behind the elbow, the impulse of the heart is plainly enough felt, and its pulsations as easily numbered; but if the ear be applied, or a stethoscope used, two successive sounds, followed by an interval of silence, are heard. “The first motion,” says Dr. Hope, “which interrupts the interval of repose, is the auricular systole. It is a very slight and brief contractile movement, more considerable in the auricular appendix than elsewhere, and propagated, with a rapid vermicular motion, towards the ventricle, in the systole of which it terminates rather by continuity of action than by two successive movements. The ventricular systole commences suddenly, and terminates in the diastole, which is marked by the second sound. Synchronous with the systole are—the first sound, the impulse of the apex against the ribs, and, in the vessels near the heart, the pulse; but, in vessels at some distance, as the radial (or submaxillary), the pulse follows at a barely appreciable interval.”—“The *rhythm* of the heart—that is, the duration of the several parts of this series—which

constitute what may be called *a beat*, is the same as described by Laennec: viz. 1. The ventricular systole occupies half the time, or thereabouts, of a whole beat. 2. The ventricular diastole occupies a fourth, or at most a third. 3. The interval of ventricular repose occupies a fourth, or rather less, during the latter half of which the auricular systole takes place."

This brief exposition, from Dr. Hope, of the action of the heart, will prepare us for that practical study of its movements in a state of health which it is absolutely necessary for us to institute before we can take due cognisance of those present under disease. Laennec directs this study to be conducted under four views or heads:— 1. The extent over which the actions of the heart can be heard. 2. The shock or impulse communicated. 3. The nature or intensity of the sound. 4. The order or rhythm. In our examination we must take care that the animal be in a state of perfect quietude, and entirely free from any suspicion or alarm concerning our presence or doings with him.

The extent to which the sound of the heart's action is audible will vary, even in health, according to the make and *embonpoint* of the subject under examination. In lean and narrow-chested horses it may be heard upon the right as well as upon the left side, and upon the latter over a large superficies: on the other hand, in such as are circular-chested and fat, the sound will be confined to the left side, and to the spot directly opposite the heart. Exercise or agitation of any kind will augment the sphere of sound; and during those violent beats of the heart called *palpitation*, their influence will extend even beyond the chest, to other parts of the body. "By *hypertrophy*, the impulse is increased, but the sounds diminished."—"By *dilatation*, the impulse is diminished, often to the extent of being imperceptible." "By hypertrophy with dilatation, the contractions of the ventricles give a strong impulse"— "abrupt, dead, violent blows, which strongly repel the hand."¹

¹ For most valuable information on these points consult Laennec and Hope.

The diseases of the heart and its appendages naturally range themselves into three classes: those affecting the pericardium; those affecting the substance of the heart; and those affecting the lining membrane, and valves of the heart and great blood-vessels.

PERICARDITIS.

The pericardium is by no means infrequently the seat of inflammation. In opening horses that die of pleuritic disease, nothing is more common than to find effusions of fluid and lymph within the pericardiac cavity, as though the one membrane had morbidly sympathised with the other. "Redness alone," Dr. Hope says, "does not afford conclusive evidence of pericarditis, as all serous as well as mucous membranes are liable to vascular injection from various causes independent of inflammation." The effused lymph is mostly disposed in layers upon the internal surface of the sac, and upon the exterior of the heart, giving additional substance to the one, and often a complete coating to the other, and, in some instances, forming adhesions between the two. In this manner, the pericardium may be increased in thickness to an enormous extent. The lymph assumes the same albuminous character as it does in the chest, and, on being cut into, while recent, displays a honey-comb sort of texture, having its interstices loaded with a yellow serous fluid: in fact, putting on the same appearance, only that it is more concrete, as it does within the chest, and undergoing—should it remain—the same changes towards organisation. In process of time, and when it exists as an additional lining to the pericardium, it grows close and firm, and becomes attenuated in substance, and turns of a white colour. In one instance I found it converted into a substance of the nature of cartilage, about an eighth of an inch in thickness. A French V.S. (Delalande) describes a strange appearance of the pericardium in a cow who died of the disease. It had acquired "extraordinary size," and

was attached around "by *carno-ligamentous*" substances. One part of its exterior was "of a lardaceous fatty character;" another, "glandular;" and another, "carcinomatous." It contained three gallons of "brown serous fluid, resembling, in fetor and colour, human excrement dissolved," &c.¹

Pericarditis may assume either the *acute* or *chronic* type. It may exist as an idiopathic affection; but in most cases it will be found to be secondary—consecutive on pleuritic inflammation. That it may, at least in a chronic form, commence by itself, and run its course alone, is in some measure proved by the cases of hydrops pericardii which every now and then present themselves unaccompanied by disease of other parts.

The SYMPTOMS of pericarditis, as an idiopathic or isolated disease, I am afraid we must, with D'Arboval, admit "have not yet been determined on." And he adds, "It cannot be distinguished from *carditis*, which is uniformly fatal." Even in man, with all the advantages surgeons possess in being orally informed of the pains and feelings of their patients, the diagnosis of pericarditis has always been considered extremely difficult and doubtful. "Dry cough; hurried respiration; palpitation of the heart, the impulse of which is sometimes violent, bounding, and regular, though its beats may, at the same time, be unequal in strength; at other times it is feeble, fluttering, and irregular; pulse always frequent, and generally, at the onset, full, hard, jerking, and often with a thrill." Such are the symptoms, applicable to the cases of horses, which Dr. Hope gives as characteristic in man; and such, probably, it will be wise in us to set before us in practice until, from actual observation on our own part, we shall be in a situation either to reject, alter, or confirm them.

Mr. PRITCHARD, V.S., Wolverhampton, with laudable zeal for the promotion of our art, so long ago as the year 1833, furnished THE VETERINARIAN with some practical communications on this subject, which we shall find it ad-

¹ 'Veterinarian,' vol. xiv, p. 436.

vantageous to revive on the present occasion. His observations relate particularly to

HYDROPS PERICARDII.

This implies the stage of pericarditis when effusion is taking or has taken place, and the membranous sac is supposed to contain watery fluid, and probably lymph as well.

The SYMPTOMS of this affection, apart from pleurisy and pneumonia, Mr. Pritchard informs us, are "well marked." They are, "palpitation of the heart. The carotid arteries beat forcibly, and are readily recognised in applying the finger to their course in the neck. There is a good flow of blood through the jugulars; a copious return of blood through the neck, when the state of the pulse is considered; the surface of the body and extremities are warm; and these latter symptoms continue until within one or two hours of the horse's death."—"In addition to the above symptoms, there is such an expression of alarm and anxiety in the countenance of the animal as no other malady produces."—"The respiration is but little disturbed."

The FLUID COLLECTED in most cases resembles the serum of the blood. Sometimes it is red, from being tinged with exuded blood; at others it is turbid from lymph floating in it; not unfrequently it is sero-purulent in character, and looks like so much whey. Now and then we find pus in flakes mingled with it. In quantity it varies considerably, from a pint to a gallon or more. The horse generally sinks from other disease, or from constitutional irritation, before the cavity be filled. I recollect, however, a case of a cart-horse, which occurred while I was a pupil at the Veterinary College, whose death, without any previous sign of illness, took place quite suddenly and unexpectedly, in whom the pericardiac sac was found distended to that degree of plentitude with fluid, that the heart had absolutely become inundated and choked in its action.

The PATHOLOGY of this dropsy, so far as our present investigations have gone, would appear to admit of various

explication. Either inflammation or increased vascular action might be assigned as its cause, and this frequently co-exists with disease in the pleura; or, it may be contemporaneous with that dropsical diathesis of body, under the constitutional influence of which all the serous membranes—those of the chest and abdomen, and head too perhaps—are pouring forth augmented secretion. Rarely, I believe, will this dropsy prove dependent upon disease or disorder of the pericardium alone.

RUPTURE OF THE PERICARDIUM.

Mr. G. M. MARSHALL, of York, relates a case of this description. He was summoned very early in the morning, in August, 1838, to a case of tetanus. Being acute and highly dangerous, he continued in attendance until the evening, when, on entering the stable, he all at once heard “a thumping sort of noise,” which, he found, was occasioned by a strong spasmodic action of his (the patient’s) heart.” In a few minutes after, the horse died. The heart was found “much enlarged, and the *pericardium ruptured*. There was no blood in the heart.”¹

CARDITIS.

INFLAMMATION of the muscular substance of the heart may be either general or partial: at least, this is the division made of it by Laennec, who nevertheless adds,—“There perhaps does not exist on record a satisfactory case of general inflammation of the heart, either acute or chronic:”—“unless, indeed, we choose to consider the word *inflammation* as synonymous with (discoloration or) *alteration* or *disease*.”—“pus must be considered as the most unequivocal indication of inflammation.”

Veterinary records do not appear to furnish any such cases as would, according to the above definition, be regarded as carditis.

¹ The case will be found in ‘The Veterinarian,’ vol. xiii, pp. 140-1.

It appears to me that cows are more the subjects of heart disease than horses. Mr. CARTWRIGHT describes a case in the XIIIth vol. of 'THE VETERINARIAN,' in which "the heart beat most violently, and there could be heard 'a sort of rustling noise about it.'" And in cows, as well as horses, it seems sometimes to be the result of metastasis, and to possess the character of rheumatic inflammation.

Several continental veterinarians have treated the subject in their works, with the usual routine of symptoms, causes, and treatment; but the perusal of their accounts turns out to show—what would appear to be the case in human as well as horse medicine—that the "symptoms and diagnosis of *true* carditis are so little different from those of internal and external carditis that nothing precise can be advanced under this head." This is said by Dr. Copland, and I believe it applies with as much force to horses as to men.

ENDOCARDITIS.

INFLAMMATION OF THE LINING MEMBRANE OF THE HEART, implied by the above heading, if we except pericarditis, with which it is often combined,—owing, it is said, to the almost contact and connection of the external and internal membranes through the muscular interstices of the heart,—appears to be the form assumed by disease in this part of the horse, in preference to carditis, which latter is not only rare in existence, but mysterious in its detection and development. Endocarditis would appear to be, sometimes, an accompaniment, if not an origination, of disease of the valves.

The SYMPTOMS of the presence of endocarditis, so far as we have been able from our own practice, and that of others, to collect them, appear to be—violent palpitation of the heart, by which we mean, quick and violent beating, amounting to what might be called *thumping* of the heart against the ribs, shaking the entire framework of the body, and rendering the heart's pulsation visible even at some yards' distance from the animal; while the pulse at the jaw, temple, &c., indicates no such commotion. Sometimes this

agitation of the heart is at first no more than occasional, though it afterwards becomes perpetual. Consonant with this, when the valves are affected, will be observed regurgitation of blood into the larger veins, as seen in the jugulars at their entrance into the thorax, causing them to pulsate, or leap, as it were, from their places, and even to become contorted. The respiration is not affected at times, but only in paroxysms—not constantly, or not at first. Febrile symptoms will supervene upon, or prove concomitant with, these; and, as the inflammation in the heart progresses, will grow alarming, the disease being a very dangerous one, and likely to end in death.

I subjoin some cases which will illustrate what has been said about the symptoms.

Mr. SIMPSON, V.S., Southampton, relates a case in *THE VETERINARIAN* for 1834, in which this affection appeared extremely well marked after death, with, to say the least of them, strong indications of its presence during life. In the commencement, the case manifested symptoms of abdominal pain; next, the respiration became greatly disturbed; and that was succeeded by a remarkable change in the action of the heart (from simple frequency) to three or four beats in succession, so violent as to shake the whole frame, and render its movements visible even at many yards' distance; with intervals of quietude of five minutes or more; the pulsation of the submaxillary unaffected all the while. Afterwards the violent beating became constant. Before death its force decreased, but never again down to the natural beat. *Autopsy*: Both lungs inflamed. About a pint and a half of serum in the pericardium. External surface of the heart sound; lining membrane highly inflamed, "the left auricle and ventricle being covered with spots of ecchymosis, and the whole surface of the cavities on the right side being discoloured by inflammatory action."

M. MERCIER, in *THE VETERINARIAN*, vol. xv, p. 229, relates a case of endocarditis, in which was found ulceration of the lining membrane of the heart. The case was rendered remarkable after death by the existence of a

fibrinous clot, filling the right cavity of the heart; and during life by the pulsations of the heart being unusually strong, and by being connected with *articular* affections of the fore foot and scapulo-humeral joints, successively producing consecutive lamenesses. M. Bouley, commenting on this case, says that when an irritating fluid is injected into the sac of the pericardium, through a puncture on the left side between the cartilages of the 6th and 7th ribs, articular pains manifest themselves in one or more limbs, while inflammation is developing itself in the serous membrane covering the heart; and often these pains become so great that the animal finds it impossible to perform locomotion.

DISEASE OF THE VALVES OF THE HEART.

Some remarkable instances of this disease stand on record. It would appear that such disease may be combined with endocarditis in one of its (chronic) stages, which perhaps accounts for my having found this disease in connection with rheumatic affections of the joints; at the same time it may exist uncombined, *sui generis*.

I had a troop-mare, who had previously suffered from influenza, seized some weeks afterwards with a renewal of illness obscure in its character; nor was it until one day, watching her over the half-door of her box, meditating on her case, that I observed very extraordinary pulsations, much more than the ordinary regurgitations noticed, in both her jugular veins, near their disappearance in the thorax, causing not merely remarkable saltation of them, but really some contortion of their canals.¹ Entering the box, and applying my hand to the left side, I found the heart pulsating against—actually *thumping*—the ribs in a manner I seemed to have no recollection of before, with, in the intervals, a tumultuous sort of sound, destroying the rhythm of the heart's actions. The respiration was disturbed, *but only at times*, growing in the intervals tranquil and calm again.

¹ If there is any symptom detectible, pathognomonic of this disease, it is probably this.

After death, the heart exhibited signs of endocarditis, and was hypertrophied. The VALVES, however, were the parts principally diseased. They showed, in great perfection, that kind of disease described by authors on human medicine as *condylomatous sarcoma*. The membranous substance of the valves was altogether changed into thickened wart-like growths, presenting cauliflower or fungus-like edges; resembling very much what one now and then sees in warts with ragged edges growing from the (human) penis, or rather from the prepuce. One of the three semilunar valves at the mouth of the aorta presented a bunch of the magnitude of a walnut; the excrescences on the remaining two being of the magnitude of good-sized peas. Upon these two valves the unnatural growths proceeded from the convex or ventricular sides, their concave or aortic surfaces still being, at their attachment, membranous; but of the valve principally diseased, not any vestige of its original membranous tissue remained. The BICUSPID VALVES were in a similar state of disease, but in them the morbid change was in a less advanced stage. They were, however, both of them, more than treble their natural thickness, their under or ventricular surfaces having the tubercular, condylomatous feel; their upper surfaces and their attached parts being to appearance healthy. The TRICUSPID VALVES, around their floating borders, were at least four times their ordinary thickness; and from the ventricular or inferior surface of two of them—from one more than the other—were growing excrescences of the same kind as those before described, of the magnitude of large peas; their superior (auricular) sides presenting, as in the former case, their normal aspects. The semilunar valves of the pulmonary artery bore no marks of disease. The endocardium exhibited the same red streaks and spots, indicative of inflammation, as had been observed upon the reflex pericardium. The entire case will be found in THE VETERINARIAN, vol. XIX, p. 1, *et seq.*

ENLARGEMENT OF THE HEART AND ITS CAVITIES.

Leblanc has published some 'Recherches' on the Diseases of the Heart of the principal Domestic Animals,¹ commencing by what he calls completing the anatomy of the heart, by taking the dimensions of its various parts; and afterwards studying the anatomical characters of its lesions in a great number of animals.

In a mare 15 hands high, from 10 to 12 years old, he found the walls of the left ventricle to be 1·5985 inches, and the thinnest part of those of the right to be ·5985; and that the capacity of the left ventricle amounted to 10 cubic inches, and its interior surface to 26 square inches (English). He found the relations between the heart and the size of the animals too variable to pretend to draw any comparisons between the two. In taking measure of the heart, he has adverted to its being either hot or cold at the time, because the hearts of animals a few hours after death, and of such as are still warm, are more voluminous than such as have been dead twenty-four or forty-eight hours. In horses (two entire and five not) he found the weight of the heart to range between little more than 4lbs. to nearly 9lbs.; the thickness of the right ventricle to range from 0·009 to 0·044 of a metre,² that of the left ventricle from 0·035 to 0·052; of the right auricle from 0·008 to 0·015; of the left auricle from 0·07 to 0·018; and that of the septum cordis from 0·032 to 0·042.

Almost all the lesions of the heart found in man are to be met with in horses; and they exist in the ratio of about 1-20th, according to Leblanc's computation,—one made on 150 animals, comprising horses, oxen, and sheep, all whose hearts he had carefully examined within the space of a couple of years: it being understood that all diseases, both cardiac and pericardiac, were taken into the reckoning.

¹ 'Résumé de quelques Recherches, relatives à l'étude des Maladies du Cœur des Animaux Domestiques,' par H. Leblanc. 1840.

² A French metre is 39·37100 of an English inch.

HYPERTROPHY.

This is a term introduced from the French into medicine, to signify what in numerous instances we in former times expressed by the words *over-growth*, *enlargement*, &c. It is meant to denote an exuberance of growth from excessive nutrition, causing an augmentation of natural or normal substance and volume. It would appear that almost any organ or tissue in the body may become hypertrophied or anormally augmented in volume and power, and yet preserve its normal functions sufficiently performed not to occasion any alteration in the animal economy; of which the spleen is a remarkable instance. It is only when inconvenience is thereby produced that we look upon hypertrophy in the light of a disease. On the present occasion, hypertrophy is used to denote an augmentation or thickening of the substance of the heart; in order for us to have correct notions of which, we should understand what the weight and dimensions of the heart are in the normal condition of the organ.

The magnitude and weight of the heart in health will vary with the size of the horse: it will usually be greater in a large than in a small horse, and in an entire horse than in a mare. In horses of ordinary size, its weight seems to vary from about 7lbs. to 9lbs.; in a state of hypertrophy it has been known to weigh 13lbs. I am not certain, but think it possible, that bleeding may influence its weight. Eclipse's heart is said to have weighed 14lbs.: it must have been hypertrophied. Something also will depend upon the quantity of exertion the horse may have been accustomed to.

Hypertrophy occurs in one of three forms:

1. SIMPLE HYPERTROPHY, or *hypertrophy without dilatation*, consisting simply in thickening of the walls of the heart, without any alteration in the dimensions of its cavity.
2. HYPERTROPHY WITH DILATATION, the most common form, in which the walls are thickened and the cavity dilated.
3. HYPERTROPHY WITH CONTRACTION, in which the walls are thickened and the cavity diminished.

One or two, or even all four, of the cavities of the heart may be hypertrophied. In the last case, the entire heart has been known to acquire double its natural volume, and upwards; a rare occurrence, though one which, when it does happen, is, according to D'Arboval, invariably referable to emphysema. The ventricles oftener become hypertrophied than the auricles, "because," says Dr. Hope, "they are exposed to a greater variety of exciting causes, and because the auricles are remarkably protected by the auriculo-ventricular valves." Hypertrophy is frequently complicated with chronic inflammation of the external and internal membranous envelopes of the heart.

The SYMPTOMS of hypertrophy in horses are, I am afraid, but too little known to warrant any attempt at separate description of them. The following cases will prove our surest guides in practice. I believe the first ever published in this country emanated from

Mr. PRITCHARD.—He was called to attend a three-parts bred six-year-old mare, employed in a posting establishment in Wolverhampton. "Her pulse was hard, with sufficient dilatation of the submaxillary artery; respiration laborious; membranes of the eye and nostrils vascular; surface of the body and extremities warm; off her feeding.—Mr. Pritchard "listened to the heart; its contractions were powerful, loud, and regular; but the organ was evidently much oppressed." Notwithstanding active and judicious treatment adopted by Mr. P., the mare died, owing to his not being sent for earlier. On examination, in the pericardiac sac was found a small quantity of healthy fluid. "The right side of the heart was considerably enlarged, particularly the right ventricle, and without the softening of the walls. It was a fine specimen of hypertrophy of the right auricle and ventricle." The lungs were apparently too large for their cavities, which contained but little serous fluid. They were very heavy in hand, and, when cut into, were found, throughout, œdematous.

Mr. THOMSON, V.S., Beith, N.B., published, a few months afterwards, the following case:

In March, 1833, Mr. Thomson had a horse belonging to Mr. Orr, Carse of Lochwinnoch, brought to him for examination. He was lame, apparently in the shoulder; he groaned when backed, and showed unwillingness to turn round or even move. Pulse irregular and quickened. Mr. Thomson, from the superficial examination he had, was inclined to regard it as a sort of rheumatism or founder. Venesection, purge—returned home. Mr. T. was summoned next day, and found him in the most pitiable condition,—standing with his fore legs wide extended; nostrils dilated; breathing quick and laborious; eyes sunken, pupils dilated, looking back and sighing; countenance hopeless. “Pulse had a most peculiar irregular motion, and the undulation of the jugular veins was extending up to the roots of the ears. He expired shortly afterwards. *Autopsy.*—Considerable inflammation of lungs, and pleura, and pericardium, the latter greatly distended with red fluid. The heart of enormous size, and greatly inflamed; both auricles and ventricles full of blood; parietes relaxed, and chordæ tendiniæ lacerated. The valves did not approximate to do their duty. Foramen ovale dilated. The whole mass weighed thirty-four pounds. The horse had been some time in Mr. Orr’s possession, and had worked (but neither quick nor laboriously) constantly on the farm.”

Mr. HARRISON, V.S., Lancaster, in 1836, sent an account of a case to THE VETERINARIAN, which turned out to be hypertrophy of the heart. The subject was “an aged bay coach-horse,” whose state altogether was that of extreme dejectedness, with “a very peculiar expression of eye,” and a countenance “wild, haggard, and pitiable.” Pulse from 70 to 90, soft, and, at times, “in an almost collapsed state.” Respiration perfectly tranquil, and no signs of pain betrayed. Partial cold sweats and tremors occasionally. Extreme parts cold. One bloodletting at the very beginning had been borne to the extent of four or five quarts: but, twelve hours afterwards, on attempting a second, the blood—which was so light-coloured that it hardly stained Mr. Harrison’s linen—came away tardily, and, by the time

two quarts had flown, signs of syncope appeared. On the seventh day he died. Large vesicles of air were found upon the surface of the lungs, which exhibited throughout "a very light pink colour." The right ventricle of the heart greatly dilated; the correspondent auricle not so much. The left cavities not much altered. In the abdomen a large tumour was discovered, attached to the posterior and inferior surface of the diaphragm, extending eighteen inches laterally, five inches superiorly, and being four inches thick. It proved to be composed of clots of blood.

A brown horse, aged, belonging to Sir Watkin Wynn, was found unwell after hunting, and died the following morning, at 6 o'clock. On dissection, I found nothing to account for his death, save that his heart proved hypertrophied; an affection one would imagine hunters to be, from the exertion they undergo, especially subject to: excitement, either of body or mind, being recognised as one of the chief causes of hypertrophy.

DILATATION.

By dilatation—which is also called *aneurism of the heart*—is signified, increase of capacity of any one of the cavities. When the parietes are attenuated, the dilatation is said to be *simple*; but when, although dilated, they have preserved their natural thickness, it is *dilatation with hypertrophy*. In relation to this affection, Dr. Hope says—"Although I have seen the muscular substance healthy in every form and degree of it, in general it is not so. For, when the dilatation is great, and the parietes are feeble in proportion to the quantity of blood which they have to propel, the muscle is usually more or less softened and flaccid, and in some cases of a deeper red, in others paler or more fawn-coloured than natural. The deep-red dye is attributable to venous engorgement of the muscular substance, resulting from stagnation of blood within the heart. The softening is sometimes so great, that the substance readily breaks up under pressure of the fingers."—"Simple dilatation seldom

affects one ventricle without the other.”—“Dilatation of the auricles scarcely ever exists without more or less thickening of their parietes.” We must take care to distinguish between *distension* and dilatation of the cavities. “When merely distended, they are found enlarged, firm, and tense; but these conditions almost entirely disappear when the blood is pressed out through their natural apertures. On the contrary, when truly dilated, they have no appearance of tension, are more or less flaccid, and the enlargement persists after the blood has been evacuated.”¹

Dr. Copland makes the following pertinent observations on the subject. “When the auricles are protected by a natural state of their valves, and of the auriculo-ventricular orifices, the ventricles may be dilated without the former being materially affected; but when the auricular valves are diseased, so as to occasion interruption to the passage of the blood from the auricles, or when the auriculo-ventricular openings are dilated, so as to permit regurgitation from the ventricles, then the auricles become dilated, although rarely without some increase in the thickness of their parietes.” Dr. Hope has, with truth, remarked that “change in the capacity of the cavities of the heart may result, not only from obstacles in the circulation, but also *from debility*.”

Leblanc mentions a case of dilatation of all four cavities of the heart of a horse. Vezelesse gives an account of a heart of enormous volume: it measured a foot from base to point, and ten inches from point to summit of the ventricles; its parietes were weakened by attenuation, and several of its fleshy columns lacerated. MM. Riss and Meyer have published a case of dilatation with rupture of the right auricle of the heart of a horse: the cavity was at least double its ordinary amplitude, and its walls attenuated to that degree, that, in the place where the rupture took place, they were not thicker than a sheet of paper.

One of the best accounts of dilatation the veterinary annals of this country afford, is contained in a case communicated to THE VETERINARIAN, in 1834, by Mr. PRITCHARD.

¹ From section i, chapter ii, of Dr. Hope's Treatise.

Mr. Pritchard was requested to examine a six-year-old mare, on account of falling away in flesh. He found her poor and lean on the rib, with belly large, and coat unhealthy; although she had been for several weeks in good pasture, where she, otherwise, appeared tolerably well and lively. Pulse 84, rather hard and irregular. The impulse of the heart indicated a change in its structure, by a loud and sonorous stroke, recognised on the right side of the chest nearly as forcibly as on the left. Its beating was regular; but an unnatural rhythm, a throbbing palpitation, accompanied the stroke. The blood in the jugular veins met with considerable impediment. The regurgitation observed in these vessels at the bottom of the neck, slight in horses in health, was in this mare considerable, and extended up the neck even to the head. The belly and legs were slightly œdematous. At length, diarrhœa attacked her, and carried her off. The pericardium was thinner and more capacious than ordinary. The heart appeared unusually large and flabby; lymph was effused into the cellular substance around its base; the right auricle was very much enlarged, being three times the size of the left, and its walls thin; the right ventricle was dilated, but not at all in proportion with the auricle; the left auricle was not dilated, but the left ventricle was much enlarged, and its walls, especially at the extreme of the apex, so thin that Mr. Pritchard felt a little astonished that it could have contracted without rupture, for it was not more than one eighth of an inch in thickness. The heart weighed ten pounds, and measured in circumference, at the base, two feet seven inches. The lungs were perfectly healthy. Mucous lining of the bowels tumid from serous engorgement. Absorbents of the large intestines loaded with red-yellow lymph; but near to the receptaculum chyli, with blood. The thoracic duct contained principally blood, but was not much dilated. The liver was in a state of sanguineous engorgement, weighing nearly thirty pounds. There was extravasation of blood into the parenchyma.

A most extraordinary case of dilatation or aneurism of

the left ventricle of the heart, is related in vol. xiv of THE VETERINARIAN, by Mr. HARRISON, V.S., Southport. The subject was a cart-mare, nine years old, who, from her youth, had been in the habit of drawing heavy loads, on which occasions her spirit seemed to exceed her strength, though she had always maintained her health, notwithstanding that, for some months before her death, she had not thriven as heretofore. Though apparently quite well, for the first time in her life, after a hard day's ploughing, she refused her food, and appeared very weak, for which she was bled, which made her still weaker. When Mr. Harrison first saw her she was scarcely able to stand, and, while he was in the act of feeling her pulse, she staggered and fell. The pulse, after she was down, was very small and weak, and it was not, with any accuracy, to be counted. She became comatose, with her respiration nearly suppressed, as though she were dead. When she came to, the breathing was shorter and quicker than natural. Mr. Harrison had her destroyed. The stomach was found in a state of *collapse*; but her disease was in the heart. "The left ventricle proved in such a state of dilatation that it almost filled the left cavity of the chest, usually occupied by the lung, but which latter had gradually become absorbed, to accommodate itself to the increased size of the ventricle, and this (absorption) had proceeded so far, that the lung did not exceed the size of the breadth of one's hand, and this remnant was situated at the most posterior and superior part of the chest. The brain was perfectly healthy."

OSSIFICATION OF THE HEART.

Mr. HENDERSON, V.S., London, has in his museum a remarkably fine specimen of this disease. The parietes of the right auricle are converted into osseous substance, rendering that cavity but a passive receptacle for the blood: the current must have continued without any, or with hardly any, fresh impulse into the ventricle. All that Mr. Henderson knows about the case is, that the horse from which the

heart was taken dropped down dead, in emaciated condition, in a dust-cart.

A case of ossification of the right auricle is reported in the *Récueil de Méd. Vét.* for Sept. 1840. It occurred to M. Barthelemy. The horse, small in stature and weak in appearance, worked in a public carriage, but only for five months, before he was found incapable, though only five years old. He had no cough, though it was found that his respiration and pulse were much quicker than in health, and that the slightest exercise proved sufficient to put him out of breath; though even then, the motions of his flanks were but increased in number without being rendered irregular. At length he was sent into infirmary, and died there on the sixth day, with symptoms of pneumonia in both sides. There were found abscesses and vomicæ in the lungs, with hepatization and grey tubercle, quite sufficient to account for death. But the heart also was diseased. It was so voluminous as nearly to fill the entire cavity of the pericardium; and its left auricle was ossified, and strongly adherent to the pericardium by white fibrous bands. It was double its natural size, and its ossified walls proved more than one third of an inch in thickness. The auricular septum was sound, and the auriculo-ventricular valves had not a spot of ossification. The ventricles were not sensibly enlarged.

AIR IN THE HEART.

Dr. Hope¹ received from Dr. Forbes, of Chichester, the following communication:—"I yesterday examined a boy who had died suddenly, after being affected for years with all the symptoms of extreme dilatation of the heart. I found the organ very large, from dilatation of both ventricles, and *both were distended with air*—in all, eight or ten ounces. There was no particular putridity, the boy having been dead only thirty-six hours." The Doctor informs us that a similar case is recorded in Simmons' 'London Medical

¹ Chapter iv of Dr. Hope's Treatise.

Journal' for 1785; and adds—"As air in the ventricles is incompatible with the maintenance of life, it must, in these cases, have been generated, or conveyed there, after death."

In 1837, without being aware that any similar observation had been made either on man or animals, I sent the sub-joined account to *THE VETERINARIAN* :

A horse, three years old, was taken unwell after the ordinary mode in which a febrile catarrhal attack commences. He was off his feed; dull and dejected; and his pulse was increased to about 55. He took three drachms of aloes, and lived upon a bran diet, and was ordered to be kept quiet in his stable. The day following he was removed from his stable into a box; but nothing further was done, the medicine appearing to be about acting on the bowels. The morning of the third day he purged: water-gruel was now substituted for water for his drink. He ate his hay, and appeared to be doing well. His pulse continued between 55 and 60; but was grown so feeble at the jaw that more than ordinary attention was required to perceive the beats of the artery. I saw him alive for the last time at one o'clock, on this (the third) day. At five o'clock, p.m., he had drunk a pailful of gruel, and still appeared going on well. At half-past six, p.m., he was found dead in his box; having, from the position of the carcass, evidently fallen quite suddenly, and, as it would seem, died without a struggle.

Being fully prepared to meet with some post-mortem appearance out of the ordinary way, more than usual pains were taken in opening the body. The sternum was carefully removed by sawing through the cartilages of the ribs, without cutting into or disarranging the pericardiac membrane. No sooner was the pericardiac case opened, than out protruded the heart with a very unusual sort of jerk, it appearing as though the bag containing it were too small for it, and it were pressing for liberation. Denuded of its bracing membrane, the heart plumped up—the right ventricle in particular, which now lay uppermost—appearing enormously distended, the tumefaction conveying to the pressure of the fingers the sense of fluctuation. I myself,

as well as my friend, the late Dr. Campbell, who was present at the examination, opined, either that fluid blood or air must be within. I cut into the ventricle transversely, near its apex, with a scalpel, and, to my surprise, a quantity of air burst forth, the parietes of the cavity instantly after collapsing precisely in the manner a distended stomach or intestine would have done; and what adds to this similitude is, that the escaped gas had a fetid odour. This was followed by a copious efflux of fluid, grumous, ill-conditioned blood, which, as it flowed, bubbled and frothed as though air had been mixed up with it. The parietes of the right ventricle were unusually thin from the dilatation they had undergone; while those of the left ventricle were in altogether an opposite state—extraordinary contraction and density, almost to the obliteration of its cavity. The auricles both contained blood; but there was this difference—that, in the left, the coagulum was unusually small and firm, while the blood in the right was very loosely and imperfectly coagulated. The coagula in the pulmonary veins were perfect, but soft and black, and easily lacerated. The right lung was dark-coloured, and in places exhibited incipient hepatization: the left lung was in a perfectly sound condition.

RUPTURE OF THE HEART.

This sad and fatal lesion arises in one of two ways:—it may either be the result of mechanical force, or it may be the product of ulceration.

ANY VIOLENT ACTION OR EXCESSIVE EXERTION may prove the occasion of rupture in a heart perfectly sound and healthy. I recollect, some years ago, during one of the racing meetings that used to be held annually at Woolwich, one of the horses, who had vehemently contested, and lost only by half-a-neck, a heat, suddenly falling and dying just after he had passed the winning-post; whose body I afterwards examined, and therein found the heart, burst: I think it was the right auricle that had given way—the animal had literally died of “a broken heart.”

In my regimental predecessor's time, one of the troop-horses, intended to mount king's guard, from the same cause, "dropped down dead" on the parade.

OF RUPTURE FROM ULCERATION there is a case related by M. Gaullet, in the *Recueil de Médecine Vétérinaire*, which appears to afford an example:

A horse, seven years old, had experienced within a short lapse of time three or four fits resembling those of epilepsy, the prominent symptoms of which were:—stiffness of the fore limbs, with spasm and tremor of the muscles of the shoulder and arm; the eyes much turned inwards, the opaque cornea alone being visible; the animal moved with so much difficulty, that, if compelled to stir, he fell and lay for half an hour in a state of rigidity, grinding his jaws; then arose again, and fed as though nothing had happened. For a month before he died, this horse was treated for pulmonic disease; in the course of which, they took him out for a little walking exercise. In his walk he met with rather a sharp ascent, which, for want of breath, he could not climb. Some days afterwards the same attempt was renewed, but with no better success. An hour after his return to his stable from this last journey, the horse was seized with his former symptoms, fell backwards, and remained down for half an hour, with his neck in a state of tetanic rigidity. Fifteen days after one of these fits, he died. The abdominal viscera, the pleuræ, and the lungs, were sound. About the middle of the right ventricle of the heart was discovered a small fistulous aperture, with smooth borders, and from one to two lines in diameter, through which issued a pale sanguineous fluid. Within the ventricle, communicating with the aperture, was a longitudinal rent, an inch and a half in extent, but diminishing in breadth towards the opening outside, which was surrounded by whitish and slight tumidity, half an inch in circumference.

Along with the above, M. Gaullet communicated an analogous case to the Central Society of Agriculture. The horse experienced great difficulty in moving, with especial inconvenience on the left side, and no one could divine the

cause. Twenty-five days after the attack he died. The right ventricle presented an old rupture, which showed for some breadth the commencement of cicatrisation.

POLYPUS OF THE HEART.

A case of this is related by Mr. KAY, V.S., Pontefract, Yorkshire, in the sixteenth volume of *THE VETERINARIAN*, p. 555, occurring in "quey" (or steer) calf, 13 months old, which gave no pathognomonic symptoms of its disease until the fourth day, when Mr. Kay, "after a careful diagnosis of the case, arrived at the conclusion, from the irregularity of the circulatory system, that something abnormal must exist in the fountain head of circulation. Next day, the pulse grew very feeble and irregular; great prostration of strength, with partial paralysis of the hind extremities, &c. The case went on a week longer, and then the calf died. When opened, "cutting into the substance of the heart, Mr. Kay discovered a *polypus* adhering to the interior of the muscular parietes of the right auricle;" and there was a similar substance in the right ventricle, "adhering to the muscular substance of that cavity, which, when removed, weighed from five to six ounces." "On conversation with the owner, Mr. Kay was informed, that he had lost, previously, two calves about the same age, and both out of the same cow, exhibiting the same symptoms previous to death."

TUMOUR OF THE HEART.

Mr. SHENTON, V.S., Bakewell, Derbyshire, has in the twenty-fifth volume of *THE VETERINARIAN*, related cases, both in the cow and horse, of the above. In an old cow he was called to, whose case from the first was "hopeless," and who shortly died, he found, though the lungs were "in a perfectly normal condition," when he came to open the heart, "growing from the septum ventriculorum," a large tumour, the size of a common breakfast-cup. Attached also to the tricuspid valves and chordæ tendineæ were numerous other

growths of a similar nature, varying in size from a common large pin's head to a horse-bean. They were all distinctly fibrous in their nature, and could be torn into shreds the same as a piece of macerated tendon. In the centre of the large growth the process of suppuration had commenced. The other cavities of the heart contained no trace of any abnormal products.—(VETERINARIAN, vol. xxv, p. 1.)

In the same volume, Mr. SHENTON relates a similar case occurring to a horse. He was sent for to a black filley on account of lameness; a month afterwards, he was recalled to her, and then found her at grass in emaciated condition. He considered (she being still lame) the case to be one of rheumatism. Ten days after he had been called in a second time, being about to leave his patient, "somewhat puzzled as to her case, when, on observing her walk towards the door, I was struck at seeing the blood at each pulsation *regurgitate in the jugular veins*, as high as their bifurcations. It directly occurred to me that there must be some obstruction offered to the free course of venous blood through the right side of the heart; and the more I thought about this, and examined my patient for it, the more firmly I was convinced that such was the case. I then left her, hopeless." A fortnight afterwards Mr. Shenton was informed that she had been "found dead in her box." "I went the following day and examined her. With the exception of two or three enlarged mesenteric glands, nothing was found until we came to the *heart*, which presented nearly the same appearance as in the former case, only that the *tumour* was attached to the *yielding*, and not to the solid wall of the ventricle."

ANEURISM OF THE AORTA.

Although aneurism is by no means an uncommon disease in our own bodies, in horses it is comparatively rare; so rare, that it scarcely has become an object of veterinary practice. Nevertheless, as extraordinary occurrences, accounts of cases must be at all times interesting to the Veterinarian, and as such I give those that have come under

my own observation, together with some others, of which there are several to be found scattered through the pages of *THE VETERINARIAN*.

The first I shall notice is a dried preparation belonging to my father's museum, at Woolwich, a very fine specimen of aneurism of the thoracic aorta. In shape, and indeed in magnitude, it may well be compared to a gourd of ordinary growth. Through the bottom of the aneurismal sac are two large circular apertures, where, evidently, it had burst into the cavity of the chest. In several places the sac is much attenuated, and appears—as far as one can judge in its dried state—to have been in an ulcerated condition at the time of death. Whether the sac is formed of the dilated or augmented coats of the vessel, or is composed of adventitious coatings, it seems impossible, correctly, to determine: its appearance most favours the latter supposition. No other history attaches to the preparation than that “it was brought from the slaughter-house.”

Mr. Field has in his museum in London a preparation of the same kind as the one described above, and in most respects very similar to it.

Mr. Bowles, V.S., Blanavon, in 1841, sent Mr. Morton, of the Royal Veterinary College, a specimen of ossified aneurism of the posterior aorta, a little anterior to the first lumbar vertebra, taken from a mare that died of ruptured spleen.

Herr Böhling (or Röhling), from four cases he relates of aneurism, comes to the following conclusions:—Aneurism of the large arteries, in any of the cavities, particularly the aorta or mesenteric, may be ascertained by certain signs, through which a sure diagnosis may be established. The surest of these signs is the *pulsation of the parts*. Besides this pulsation, there is another symptom equally of importance, which is the *slow pulse*; or, as sometimes happens, an intermittent pulse. All we can add to this is, that, in our opinion, it little augments our knowledge of the mysterious existence of aneurism of the aorta or mesenteric arteries.

The following cases occur in the foreign journals:

In the 'Journal Pratique' for September, 1826, are two reports of aneurism by M. Chenard. A mare was led to him having fistula. She could hardly, he observed at the time, drag her hind legs after her. She had no sooner got into the stable, than she fell on her haunches, and never rose again. She was bled and purged, but died on the sixth day. Internal tunic of the aorta highly inflamed; and immediately behind the emulgent artery was a true aneurism as large as a hen's egg. Just below was an aperture in the vessel which protruded in the form of a pedicle, and communicated with another tumour, of the size of a child's head, full of fibrous matter, laminated. A similar clot filled the artery posterior to dilatation. The membranes occupying the spinal marrow in the lumbar region were also highly injected, and the marrow itself was softened and surrounded by a serous fluid.

Another mare, usually full of animation and energy, suddenly, and without assignable cause, became spiritless and incapable of work. This continued for some months, when attention was directed to her loins. She turned with difficulty; shrank from pressure on the loins; was costive; and voided her dung and urine with straining and pain. She was treated for nephritis, and got better; but after a very little work every symptom relapsed. Two months afterwards her hind legs commenced swelling, and this went on to produce ulcerations, all which subsided again. One day she was seized with cramp in the near hind leg for a quarter of an hour. In two months again she got so well as to be considered fit for work. She performed one journey; but had hardly commenced a second when she on a sudden lost the use of her limbs, then fell upon her off side, uttering dreadful cries. She continued for two days paralytic in her hind parts, then died. The posterior aorta at the root of the emulgent artery was dilated to double its ordinary caliber, and a tumour, osseous above and cartilaginous below, communicated with the aorta by an aperture the size of a nut, having attenuated edges. The aneurism ended abruptly near the origin of the crural artery. The

internal coat was ulcerated where the ossific process had taken place, and a clot completely blocked the dilatation, and the posterior divisions of the aorta as well, and extended even to the origin of the renal arteries. The membranes of the spinal marrow were also highly inflamed above the lumbar region; and the marrow itself was softer than natural, and covered with bloody spots.

The subjoined case occurred in 1826 at the College at Alfort :

A mare was brought in very lame from a sinus in the foot, perforating the long flexor tendon, which was treated for three weeks; when one day, while the foot was being dressed, the mare suddenly reeled about, threw up her head, and fell down. No sooner was she down than her nostrils and chest and belly and flanks were all in convulsive action for breath; her limbs became stretched, and her eyes rolled in their orbits. The jugular was opened instantly; but drops of blood only issued. In this very act, death closed the scene. The pericardium was found prodigiously distended with coagulated blood, looking at first like hypertrophy of the heart. This coagulum weighed five pounds. The trunk of the aorta was extensively ruptured at its base, and the lesion was evidently the result of attenuation of its coats.

ANEURISM OF THE ILIAC ARTERY.

The late Mr. KING, V.S., Stanmore, showed me a dried preparation—a specimen of an aneurismal tumour, communicating, as it seemed to him (for there was much confusion of parts), with the external iliac artery; if not with that, with the gluteal. The aneurismal sac was composed principally of the parts immediately adjacent. In several places it had become ossific: indeed, so large and evidently spreading were some of the patches of osseous matter, that, had the animal survived any great while longer, there is little doubt, ultimately, the whole sac would have become converted into bone. The history of the case was—A horse, not worth

much, was casually brought into Mr. King's yard with a tumour equal in volume to a large pumpkin, and of an irregularly ovoid shape, upon the postero-superior part of the quarter. Finding it fluctuated, Mr. King, by way of experiment, punctured the swelling with a lancet. A gush of blood followed the puncture. Compresses of tow, cloths, bandages, &c., were immediately applied. In the end, however, the animal became reduced, and died.

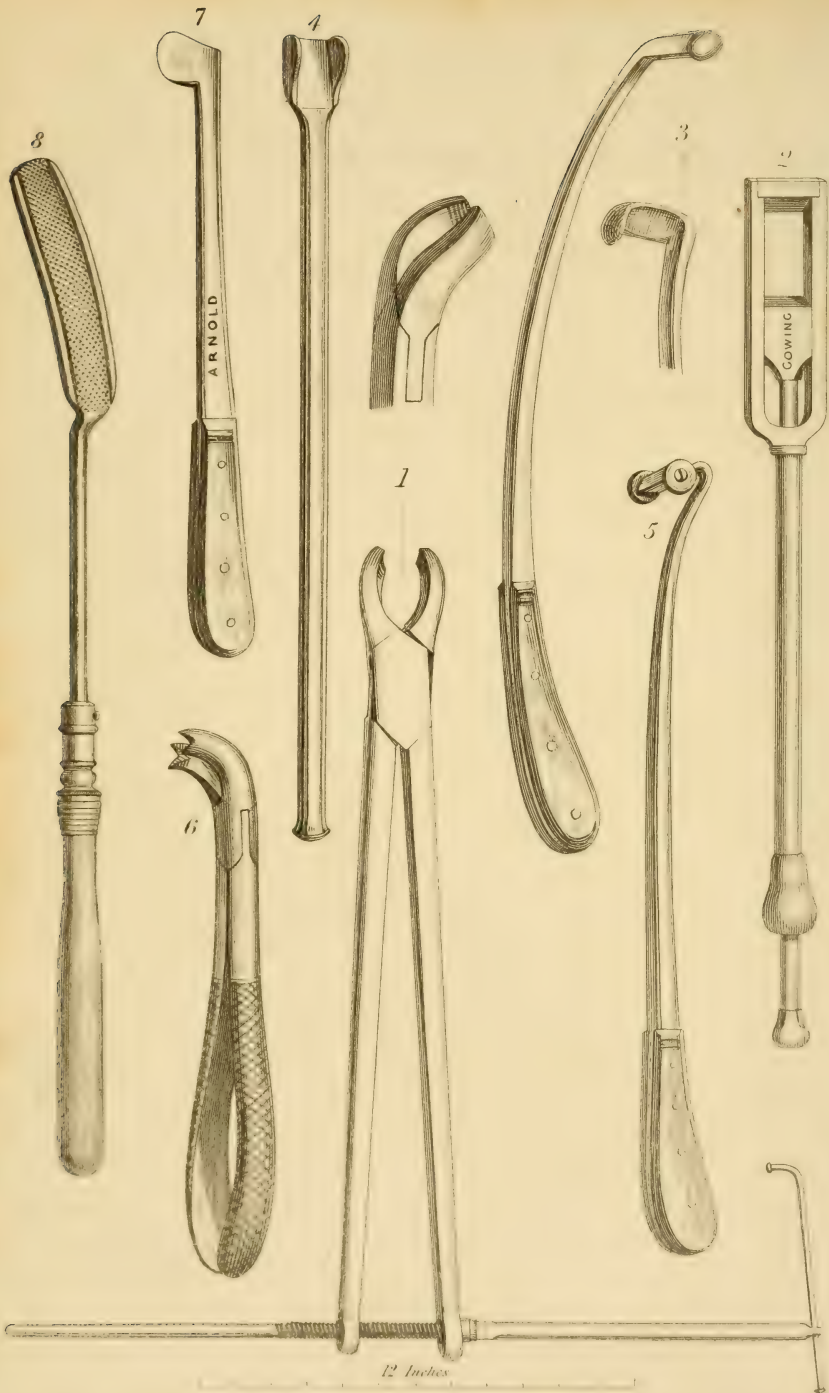
ANEURISM OF THE RENAL ARTERY.

Aneurism of the left renal artery, as large as the aorta, was found by M. Chouard in a horse, who was destroyed on account of a carcinomatous affection of the left kidney. For an account of the case see "Nephritis," Hurtrel d'Arboval's Dictionary.

Robert Laillan

V. Surgeon

Cincinnati 1856



Gowings Dental Instruments for the Horse

THE DISEASES
OF
THE DIGESTIVE ORGANS
OF
THE HORSE,

INCLUDING THOSE OF HIS
URINARY AND GENERATIVE SYSTEMS.

WITH ILLUSTRATIONS.

BEING PART II, VOL. II, OF THE AUTHOR'S 'HIPPOPATHOLOGY.'

BY WILLIAM PERCIVALL, M.R.C.S.

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THOROUGHLY REVISED, WITH EXTENSIVE ADDITIONS.

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HIPPOPATHOLOGY.

PART II, VOL. II.

SECTION IX.

DISEASES OF THE TEETH, PHARYNX, AND ŒSOPHAGUS.

DENTITION.
LAMPAS.
SHARP
PROJECTING } TEETH.
TOOTH-ACHE.
CARIOUS TEETH.
PARROT MOUTH.

TUMOR OF THE LIPS.
TUMOR UPON THE FACE.
SALIVARY CALCULI.
STRICTURE OF THE ŒSOPHAGUS.
RUPTURE OF THE ŒSOPHAGUS.
CHOKING.
ŒSOPHAGOTOMY.

DENTITION.

By DENTITION is meant the breeding and cutting of the teeth. From a few months after birth until the fifth year of his age, the horse may be said to be breeding and cutting teeth. It is not, however, with the animal as with children, who sicken, and even die, in tender infancy from the cutting of their first teeth; on the contrary, his sucking teeth appear to cause him as little inconvenience as our permanent set do ourselves, whereas the coming of his second teeth occasionally causes him somewhat of the same kind of suffering and irritation which we so often observe among children. There is, connected with dentition, another peculiarity in the

horse which we must not let slip our observation. Although the period of teething, properly so called, may be said to be terminated at the fifth year, yet we must recollect it has been satisfactorily demonstrated, that, in him, there is a process of growth going on in the teeth through the remainder of life ; so that, in fact, at no period can the animal be said to be exempt from the influence of dentition. This accounts for lampas appearing in old as well as young horses, and furnishes my mind with strong proof, that the tumidity of the bars of the mouth is dependent upon operations going on in the teeth, and upon that cause alone.

There was a time when, I must confess, I treated the subject of dentition so lightly as to think that horses never suffered or became disordered from such a cause. Experience, however, has altered my opinion. I can now, in practice, frequently discover young horses with disorder or febrile irritation upon them, the production or continuation of which I hesitate not to ascribe to teething ; and I find these views borne out by the relief obtained by the increased attention I am in the habit of giving to this assumed cause in my treatment. In illustration of this, I will here relate a case which occurred to me many years ago ; the very one, in fact, which proved the occasion of my looking afterwards more closely into dentition.

I was requested to give my opinion concerning a horse, then in his fifth year, who had fed so sparingly for the last fortnight, and so rapidly declined in condition in consequence, that his owner, a veterinary surgeon, was under no light apprehensions about his life. He had himself examined his mouth, without having discovered any defect or disease ; though another veterinary surgeon was of opinion, that the difficulty or inability manifested in mastication, and the consequent *cudding*, arose from preternatural *bluntness* of the surfaces of the molar teeth, which were, in consequence, filed, but without beneficial result. It was after this that I saw the horse ; and I confess I was, at my first examination, quite as much at a loss to offer any satisfactory interpretation as others had been. While meditating, however, after

my inspection, on the apparently extraordinary nature of the case, it struck me that I had not seen the tusks. I went back into the stable, and discovered two little tumours, red and hard, in the situation of the inferior tusks, which, when pressed, gave the animal insufferable pain." I instantly took out my pocket-knife, and made crucial incisions through them both, down to the coming teeth, from which moment the horse recovered his appetite, and by degrees his wonted condition.

The above case might likewise be quoted in illustration of another fact connected with this subject, which is, that the cutting of the tusks—which may be likened to the eye-teeth of children—costs the constitution more derangement than the cutting of all the other teeth put together; on which account, no doubt, it is that the period from the fourth to the fifth year proves so critical a one with the domiciled horse. Any disease, pulmonary in particular, setting in at this interval, is doubly dangerous, from its being augmented or kept up by the existing irritation of teething: in fact, teething is one auxiliary cause of the known fatality among horses at this period of their lifetime. -

Professor Gallé, of Toulouse, who wrote, in 1839, 'A Treatise on the Pathology of the Ox,' says: "The cutting of the teeth in the ox, as well as in the horse, is attended by loss of appetite, and redness and heat of mouth; the head hangs down; the eyes weep; and sometimes there is cough, coryza, and diarrhœa." "I have seen persons, careless or deficient in medical tact, bleed and physic an ox, supposing that they were combating bronchitis or gastro-enteritis; and, after two or three days, the proprietor or the cowherd has found one or two molar teeth in the manger."

Reasoning, *en philosophe*, on the subject, with a view of showing in what manner teething is necessarily productive of the consequences ascribed to it, D'Arboval tells us to observe how the vital energy becomes augmented about the head, and upon the mucous surfaces in particular. "A sort of local fever originates in the alveolar cavities, running high or low according to the resistance the teeth encounter from

the hardness of the jaws, or their own disproportioned size and solidity. The gums become stretched from the pressure of the teeth against them; they dilate, sometimes split; at the same time they are red, painful, and hot, even to a sense of burning, and they spread. Internally, the roots of the teeth, from shooting downwards, compress the dental nerves, and painfully drag the periosteal linings of the alveolar cavities. These combined causes will sufficiently account for the local irritation and suffering accompanying teething, and enable us to explain many morbid phenomena we find appearing in horses about this—from various circumstances—the most critical period of their lives.”¹

THE EFFECTS OF DENTITION upon the constitution may be said to breed, or add to the intensity of, excitation, causing fever, catarrhal disorder, cough, glandular swellings, ophthalmic irritation, cutaneous eruption, derangement of the bowels, urinary disturbance, loss of appetite and consequent emaciation. My respected predecessor, the late Mr. Bloxam, has left behind him, in his Registry of Sick, several such entries as “fever from dentition”—“suffering from dentition:” in my mind, evidence sufficient to show that his opinions on this subject were much the same as those I am now endeavouring to inculcate and, let me add, they were the result of very long experience, and most patient and attentive observation. Excessive or long-continued local irritation and suffering induces a habit of nervousness and susceptibility, rendering the body doubly prone to the operation of morbid agents, and augmenting the violence of the malady when once disease has set in. For this reason I, for my own part, invariably make it my rule, in practice, when young horses are brought to me sick or unwell, to inspect their mouths, and, in particular, to notice the tusks, which, should they be prominent and pushing against the gums, I let through by making crucial incisions over their summits: at the same time, I extract any of the sucking teeth that may appear to be obstructing the growth of the set to come. In this way, I feel assured, I have seen

¹ See Hurtrel d'Arboval's 'Dictionnaire,' article 'Dentition.'

catarrhal and bronchial inflammations abated, coughs relieved, lymphatic and other glandular tumours about the head reduced, cutaneous eruptions got rid of, deranged bowels restored to order, appetite returned, lost condition repaired. I am quite sure, too little attention has been paid to the teeth in the medical treatment of young horses ; and I would counsel those who have such charges by no means to disregard this remark, trifling as it may appear.

Dr. Marshall Hall says : " There is no practical fact of the truth and value of which I am more satisfied than that of the effect and efficacy of scarification of the gums of infants, and not in infants only, but in children. But it is to the *base* of the gums, not to their apex merely, that the scarification should be applied. The most marked case in which I have observed the instant good effect of scarification was one in which *all the teeth had pierced the gums*. I have been accused of unnecessarily frequently (daily) scarifying the gums ; to which my answer is, ' Better scarify the gums *unnecessarily* a hundred times, than allow the accession of one fit or convulsion.' And it is not merely the prominent tense gum over the edges of the teeth that should be divided ; the gums, or rather the blood-vessels immediately over the very *nerves of the teeth*, should be scarified and divided as you would divide the vessels of the conjunctiva in inflammation of that membrane. And repeat daily ; in urgent cases twice a day.¹

THE PATHOGNOMONIC SYMPTOMS calling our attention, whether it be in young or old horses, if not exactly to the teeth themselves, to the mouth in general, are large discharges of saliva from the mouth, with continual slobbering ; cudding of the food ; difficulty of mastication or deglutition, or of both ; stench of buccal secretion, perhaps of the breath as well. Symptoms such as these manifesting themselves ought to lead us without delay to a thorough examination of the horse's mouth.

¹ Vide Marshal Hall's ' New Memoir of the Nervous System.'

LAMPAS.

With the subject of dentition is closely allied another one to which those knowing in horse matters, but unread in medical philosophy, attach great importance, yclept "lampas." According to D'Arboval, the word is of French origin: it is a "*terme de manège*" which has found its way into veterinary medicine from the circumstance of its having been, figuratively or burlesquely, used to signify the palate or inside of the mouth. What we, now-a-days, understand by *lampas*, is, an unnatural prominence or tumidity of the cartilaginous bars forming the roof of the mouth. These bars, naturally, are pale coloured, and arched in figure; whereas, in a mouth affected with lampas, they are red and tumid, lose their circumflexure, and appear bulging, descending upon a level with the surfaces of the upper nippers, and in some cases even below them. This apparent augmentation of substance is, no doubt, ascribable to congestion of blood; but not to that alone, for I believe in many cases there will be found to be some serous and albuminous infiltration into the cellular membrane attaching the bars to the hard palate: which will account for the length of time they are known sometimes to continue, as well as for the little relief, in regard to their diminution, which in such cases attends lancing of the gums. Although in young horses it is, I believe, admitted by all horse people, that lampas is occasioned by the cutting of the teeth, yet, in old horses, there are those who ascribe their production to other causes, and imagine they have a good deal to do with the animal's state of health, or rather with his feeding. That they may in some cases be the occasion of tenderness in mastication, I do not deny; at the same time I think I may safely affirm, that, in nine times out of ten, the cause of loss of appetite will be found elsewhere. The reason why lampas appear in aged horses, is, in my opinion, as I before stated, on account of the continuance of the process of growth, demonstrated to be going on through life, in the teeth, with the nature and laws of which we are, in

our present state of knowledge, too little acquainted to pretend to say why the lampas should exist in one horse and not in another, or why it should only at times appear in the same horse.

ARE LAMPAS DISEASE?—The complaints, heavy and grievous, which are daily reaching our ears, are enough to persuade us they are: every groom having an unthriving horse, or one that does not feed, is sure to search for lampas; and, should he find any, in his mind the cause of failure is detected, and the remedy obvious—"burning them out." Many a poor wight of a horse, even while suffering from some real constitutional malady, has been subjected to this torturing operation, with a view of demonstrating the sagacity of the groom, and thereby has got added to his other ailments, a foul, sloughy, carious sore upon the roof of his mouth. This may be said to be the fruits of

"BURNING FOR THE LAMPAS."—Supposing that their existence be owing to the teeth, do not the teeth require removal, and not the bars of the mouth? In cutting or burning away the lampas we are mistaking the effect for the cause. If it be contended that lampas do not owe their production to the irritation of teething, then, I should like to be informed what is the origin of them; and, let what will give rise to them, I do not imagine there is any veterinarian hardy enough to contend that the cause resides in the palate, or becomes removed by the actual cautery! Those who are entering private practice, and find themselves compelled, at times, to belie their consciences by the performance of unnecessary operations to please their employers, may be told, that burning out lampas is, after all, preferable to lancing or cutting the bars; for, unless the palatine artery be wounded, very little blood is obtained by stabbing the mouth; and the wounding of this vessel, which will certainly take place should the punctures be made along the *sides* of the palate, or extend forward beyond the fourth bar from the front teeth, is not always a very *safe* proceeding. I remember a case of the kind in which it be-

came necessary to bind compresses of tow firmly upon the bleeding parts ; which could be effected only by carrying a broad tape around the jaw between the tusks and corner incisors, and confining it there by tying its two ends in a knot upon the front of the gum, underneath the upper lip. After a couple of hours the compress was removed, and the hemorrhage proved to have been permanently arrested. Had the operation of *torsion* been known to me, I might, I think, have succeeded in stanching the hemorrhage with less trouble and in less time.

THE OPERATION OF BURNING, if it must be performed, appears best done in the old farriers' mode of proceeding. An iron, shaped as under,



is heated to redness, and with its edge, which ought to be sharp, a portion of the substance of the bars, about the size of a crown piece, from the middle and most protuberant part, is sliced off ; care being taken that the instrument does not penetrate deep enough to sear the bone. This at once gets rid of the assumed evil, and is altogether the preferable operation ; nor will it, performed in this partial and cautious manner, be productive of any very serious mischief.

SHARP AND PROJECTING TEETH.

Among the annoyances and hinderances the horse experiences to his eating, may be classed a sharpened and overgrown state of the molar teeth or grinders. Some irregular action in the jaws occasions a slanting wear of their grinding surfaces, and the consequence, in the course of time, is the projection, to a considerable extent, of the inner of the lateral edges of those teeth beyond the outer, and the consequent conversion of their grinding surfaces, from an asperous level into an inclined plane, of greater or less extent according to the length of time the change has been going

on. It would appear that this irregular action is the result of some original malformation of the jaws, whereby the teeth have a wrong direction given to them, or, at least, do not come into that complete apposition which is so essential to their due masticatory operation. The wear, instead of being level and uniform, takes place all on one side; while the opposite, unworn side continuing to grow, the consequence, in process of time, is a production at once most remarkable and unnatural: of this Mr. Henderson, V.S., Park Lane, London, has in his museum a very beautiful and extraordinary specimen.

Not only are the teeth, when they have acquired this unnatural shape, in a measure unfitted for the purposes of mastication, but are, by their projections, apt to excoriate and lacerate the sides of the cheeks or of the tongue,¹ depending upon which jaw they are situated in, and whether their sharpened edges are slanting inwards or outwards. What commonly leads to the discovery of this condition of the teeth is, the horse being observed to cud his hay: either he puts the cud out of his mouth after masticating it imperfectly, or else he retains and collects it between his cheeks and grinders, where it exhibits externally the appearance of a swelling a little above the angle of the mouth. At times a flow of saliva accompanies the cudding. And in consequence of much of his aliment being thus lost to him, the animal perceivably falls away in condition.

THE REMEDY FOR SHARP GRINDERS is the tooth-rasp. I have in all the cases of this description which have occurred to myself used this instrument with success, without having had occasion for anything beyond it. The French prefer breaking off the salient portions of the teeth by means of a hammer and chisel, the mouth being kept open the while with a gag, or a ball-iron; in regard to which proceeding I I can only repeat, I never myself found anything necessary beyond the tooth-rasp.

PROJECTING TEETH.—When once a tooth, whether it be

¹ These excoriations, and the ulcers they occasionally give rise to, are noticed in Vol. I.

an incisor or a molar, has lost its opponent, and thereby becomes deprived of all counter-pressure, it shoots beyond its fellows in the same jaw, and is apt to grow to such a length as not only to interrupt mastication, but even impede the closure of the jaws. Mr. H. Surmon relates—in vol. ii of ‘THE VETERINARIAN’—a very instructive case of this description.

“A neighbour of his possessed a horse that had continued to lose his appetite and condition for some weeks. The first time Mr. Surmon examined the mouth he perceived nothing extraordinary. The horse, emaciated to a skeleton, was to be destroyed. Mr. Surmon examined his mouth once more, and, with a balling-iron keeping it open, he introduced his hand, and discovered two lower teeth, one on each side, which had outgrown the others to that extent that they were actually pressing against the roof of the mouth. Mr. Surmon made attempts to extract them with a key, such as is used by surgeons; but these proved fruitless. He afterwards contrived an instrument, (which is here represented) with which he perfectly succeeded. In using it, he passed the forked end into the mouth, and fixed the tooth to be extracted within the fork. The handle—a most powerful lever—being then turned on



its axis, the tooth became forced out with the greatest ease. The horse Mr. Surmon operated on, began after the operation to feed again, and rapidly recovered his health and strength, and went to work as well as ever.

This instrument, however, after all, amounts in operation to nothing beyond the ordinary tooth-key, upon a magnified scale, and is in many respects not so efficient, in consequence of its wanting the adjusting and grasping powers of the key. Mr. Cherry, the Principal Veterinary Surgeon to the Cavalry, is in the habit of using a key of such large dimensions that the handle is intended to be turned by *both* hands of the operator, thus affording him a lever-extractor of highly augmented power.

Of late years dental human surgery has undergone considerable improvement. The old tooth-key is laid aside to make room for retraction-forceps, so constructed that, once the body of the tooth, close up to its neck, firmly clutched by them, a strong pull, or rather *draw*, extracts the tooth. Not in human surgery alone, however, but in veterinary as well, I am happy to be able to add, has this department of our art received important melioration. In the year 1849, M. Gowing, V.S., London, read a paper before the Veterinary Medical Association, introducing to their notice a set of tooth instruments of his own construction, which he, as well as many other veterinarians, had at times experienced great lack of in practice. His own trials of them had quite confirmed his expectations. They consist of a pair of giant forceps (see frontispiece, fig. 1), with serrated beaks; the extreme end of one of the handles of which is furnished with an eye, while that of the other has a ferrule screw. A shaft, to operate as a lever, runs through the eye, and screws into the ferrule screw, a contrivance which renders it so powerful an instrument, as to require soundness of tooth, and care on the part of the operator, lest in the operation the tooth, or even jaw, become fractured. For the purpose of cutting down teeth which have grown out beyond the level of the others (from want of pressure from opposing teeth), Mr. Gowing has invented a dental sliding chisel (fig. 2). In its use a balling-iron and a twitch are required. And when the instrument is adjusted so that the active chisel is brought into contact with the anterior part of the tooth, a sharp blow is to be given to it, which is to be repeated, if required, once or even twice. Sometimes it will be necessary to cast the animal for examination and operation, though standing is to be preferred. But, as all the irregularities met with in the teeth cannot be overcome with the same instrument, Mr. Gowing has made another, consisting of a solid or entire piece of steel. This is the LATERAL REPELLER (fig. 3). Its use is to prevent the concussion of the jaw, while the operator with a chisel strikes off any projecting angle of tooth. The chisel Mr. Gowing has adopted is the GUARDED CHISEL

(fig. 4). Another instrument bearing some resemblance to the LATERAL, is the POSTERIOR REPELLER, whose utility is principally for the back teeth. With this instrument, where necrosis of the tooth has taken place, traction, to a certain degree, may be made, in consequence of its being turned down or necked at the end. Another instrument required is a common chisel, somewhat longer and stronger than the one in ordinary use. Also, another pair of forceps, smaller than the giant ones, without the cross-lever, but *billed* or notched at their points. (Fig. 7), is a GUM LANCET of considerable length, to "enable one to scarify gums without reaching one's hand through the balling-iron." The only alteration Mr. Gowing has made in the TOOTH-RASP (fig. 8), is the addition of a shifting handle, of some length, "whereby greater power is gained, besides the advantage of being able to add a new rasp, or any other instrument, to it, that the veterinary surgeon may deem expedient." This imperfect sketch of the "PROPER DENTAL INSTRUMENTS," will not serve for more than an inducement to the man who is in earnest in preparing himself in practice against all contingencies, to furnish himself with a case of such instruments, and make himself perfect master of their use, by perusing Mr. Gowing's excellent practical paper, which he will find in 'THE VETERINARIAN,' vol. xxiv, pp. 630-40.

TOOTH-ACHE.

Disease of the teeth is rare in the horse. Mr. Gowing has found the disease mostly occurring in cart and other under-bred horses, which he suggests may arise, in part, from the coarser food given to them. Another cause is, as the horse advances in years, the interstices arising between their molar teeth, into which the food gets and lodges. And Mr. Gowing believes it to be a fact, "that disease begins either at the neck or in the fang of the tooth in our patients, and not usually at the crown." "It is a common practice with carters to sprinkle the provender with sulphuric acid, and we all well know the action of acids on the teeth."

“THE SYMPTOMS that would indicate disease of the teeth to be present, would be—imperfect mastication, in consequence of which the stomach would have more to do, and, from the food being longer retained within that viscus, its appropriative powers would be enfeebled and deranged, which would speedily be shown by portions of the aliment passing through the digestive track entire. Associated with this would sometimes be a staring coat, with a harsh and unthrifty appearance of the animal; and what is designated *hide-bound* might also be present, accompanied with more or less emaciation, and a low febrile appearance of the system. Besides all this, in some instances we shall have a portion of the corn, in a half-masticated state, from time to time thrown out of the mouth into the manger, mixed with a quantity of saliva; also, the animal, if watched narrowly, would be observed suffering much pain during mastication, and suddenly stop and rest for a time, and then begin again to eat. Fœtor, likewise, when the mouth is examined, will be found present to a greater or lesser extent. Who has witnessed these symptoms, and seen the horse hanging his head by the side of the manger, with saliva dribbling from his mouth, cannot hesitate for a moment to acknowledge that the poor brute is suffering pain; which, if we were to call *tooth-ache*, would not be believed by our employers.”¹

CARIOUS TEETH.

There are instances on record of carious teeth being discovered, and of their being productive of such consequences as have led, through error, to a fatal termination. The following relation ought to operate on our minds as a warning in pronouncing judgment in cases of glanders, or at least in such as assume the semblance of glanders:—

A horse, the property of government, became a patient of Mr. Cherry's, on account of a copious defluxion of fetid, discoloured, purulent matter from the near nostril, unaccom-

¹ Gowing's 'Essay on the Disease of the Teeth of the Horse,' 'Veterinarian,' vol. xxiv.

panied either by submaxillary tumefaction or by ulceration of the Schneiderian membrane. For two or three months the case was treated for glanders; but, no amendment appearing, a consultation was deemed necessary, the result of which was, the horse was shot. On examination of the head, the third molar tooth proved to be carious; one third of its fang being already consumed, and the remainder rotten. The formation of an abscess within its socket had rendered the tooth loose, and the matter flowing therefrom had established a passage into the contiguous chamber of the nose. The antrum, also, was in part obstructed by the deposition of osseous matter. This is a case which, but for the inquisitiveness of Mr. Cherry, would have indiscriminately merged into that heterogeneous class of diseases passing under the appellation of *chronic glanders*.

My father's museum contained several preparations of carious teeth. One was that of a molar tooth, whose interior was black and rugged, from being eroded by ulceration, and whose fangs had from the same cause mouldered away. Two others presented brittle exostoses upon their sides, forming spacious cavities within, and communicating with the contiguous grinders. One of them exhibited a perforation through which pus appeared to have issued. They seemed both to have been cases which had originated in internal injury.

The rarity of such occurrences disinclines one to seek for them; and, especially, since we are not in possession of any sure indications of their existence. Cudding the food, fetid breath and saliva, either with or without any purulent issue from the nose, might lead to an examination of the mouth, and the discoloration of a tooth would prompt us to ascertain whether it were loose or not, and, if loose, to extract it: further than this I am not prepared to advise.

PARROT MOUTH.

By this appellation horse-people understand what dog-fanciers call "overhung;" *i.e.*, a mouth so formed—or rather so malformed—that the upper jaw overshoots or pro-

jects considerably beyond the lower ; so much so, that the inferior incisor teeth, instead of meeting their opponents, come in contact, when the mouth is shut, with the bars of the palate ; while the teeth of the superior jaw have no opposing surface whatever, unless the lower lip can be so regarded. This deformity is not a very common occurrence ; nor is it one altogether so objectionable, since the horse has the power of gathering up his hay and corn with his lips, although the process (as well as the *retention* of the food while it is being transferred to the grinders) is but imperfectly performed, as is seen by the animal, while feeding, scattering and wasting part of his corn, and slobbering at the same time. In grazing, the parrot mouth must be greatly more disadvantageous : much difficulty must of necessity be experienced in nipping off the grass ; and this seems to me to be the chief objection to the purchase of such a horse : at least, this formed the ground of objection, I remember, of a recruit horse with a parrot-mouth which was offered to the 1st Life Guards.

TUMOR OF THE LIP.

Now and then horses are brought to us with swollen lips, or rather lower lip, for I do not remember much about the upper. There grows a swelling of one side of it, confined to that side, and more apparent when the lip comes to be everted than before. It has a solid, firm feel, is perhaps altogether about the size of a pigeon's egg, and is hot, and gives pain when squeezed. I have on no occasion been able to trace any connection between the tumor and the reception of injury of any kind, from the bit, though I have known it to arise from a bite or sting : otherwise, I have been forced to regard its origin as spontaneous. I have ordered fomentation and frequent steaming of the muzzle, and cathartic medicine. In the course of the second or third day, however, it has generally happened, that the tumour has burst inwardly, and discharged a thin ill-looking purulent matter, composed probably of pus and the secretion of the lip ; after

which, by well probing daily, and injections of a solution of alum or borax, the tumour has dispersed, and the opening healed up.

TUMOR UPON THE FACE.

Those who are much among young horses will have occasionally observed osseous swellings arising upon the side of the face, midway between the eye and angle of the mouth. They grow from the superior maxillary bones, have a rounded form, and are broadish at their bases, with hardly any perceptible heat of surface, and very little tenderness on pressure. Sometimes one appears; oftener, I believe, there exist a pair. What their origin may be, I know not, unless they be the effects of blows. In composition they are evidently osseous, or osseo-cartilaginous: in fact, they are veritable exostoses. They are nowise hurtful or injurious; but they extremely disfigure the countenance of the animal: they give him a sour, ill-tempered look, and on this account are often sought to be got rid of.

A three-year old horse came to my regiment, out of the dealer's hands, with a tumour of this description upon the off side of his face. Not liking the appearance of it, the colonel was desirous I should get rid of it. I blistered it repeatedly. I next tried the effects of an iodine ointment upon it: all to very little purpose however. It was thought to have diminished; but this, in truth, was very little. I had a notion that stripping it of its periosteal covering, and leaving it bare, might cause it to exfoliate away: but this seemed to be attended with some danger of sloughing open the maxillary sinus; and therefore the project was abandoned.

Mr. Charles Percivall, V.S. Royal Artillery, has sent me the following account of the same disease:—

A four-year-old gelding came into the Horse Infirmary at Woolwich, with a tumour upon the maxillary bone of the off side, followed, some days after, by enlargement of the submaxillary glands, and discharge from the nose on the same

side. The swelling was painful on pressure, and my first idea of its nature was, that it had proceeded from a blow. Cold applications were made use of; ultimately, it was blistered. This caused it to suppurate and discharge a glairy ill-conditioned sort of matter. At the expiration of three weeks, the near side of the face commenced swelling in the same manner, which convinced me I was wrong in imagining the other tumor was caused by injury. The same treatment was pursued; but this did not suppurate. I then used the iodine ointment, which appeared to diminish it. The tumour upon the off side became fistulous, continually issuing the glairy matter, as at first, and giving evident signs that the bone within was in an unsound—most likely carious—condition.

SALIVARY CALCULI.

British veterinary practice appears to have been eminently unproductive of cases of this description. Were it not for the recorded observations of continental veterinarians, we should have felt at a loss in what way to have supplied this defect in our nosology.

From D'Arboval—our principal source of information—we learn that calculi have been discovered within most of the salivary glands, but are more commonly found within their ducts, and particularly within the parotid duct. They have a whitish aspect, take the form of the canal, and are extremely hard and weighty, tasteless and odourless, and have an oat or small pebble, which has got into the duct through the mouth, for a nucleus. When lodged in that part of the duct which is but skin-deep, the calculus is perfectly obvious; but when sticking just within the orifice of the canal, unless of considerable volume, it is difficult of detection. In this situation, when projecting, the calculus will sometimes occasion excoriation of the buccal membrane, and so far will render mastication sore and painful, besides more or less obstructing the efflux of saliva; and it may create some sort of noise during the motions of the

jaws by gritting against the teeth: these constituting the evils arising from its presence. In general, the growth of this kind of calculus is extremely slow; so that it is some considerable time before such effects are produced. When it has attained sufficient magnitude to cause obstruction, the portion of duct between it and the gland becomes swollen from the accumulation of saliva. According to the analysis of Thenard, these calculi are composed of calcareous phosphate in combination with some little carbonate of lime.

TREATMENT.—We possess no means of dissolving these calculi; but we can extract them, and in some cases without cutting into the duct, which is an operation now and then succeeded by a troublesome fistula. When the stone proves to be at the buccal orifice of the canal, and the molar teeth present the only obstacle to its escape, it will often be sufficient to extend the cheek and give it a good shake or two with the hand to dislodge it. Should the calculus appear to be strangulated within the canal, we must divide the stricture first. This may be done by fixing the mouth wide open with a ball-iron, and introducing a bistoury tied to a stick, to serve as a long handle, while the other hand is engaged in drawing the tongue out of the way. Should the stone not fall out after the division of the stricture, it may be seized with forceps and extracted. A mash or liquid diet ought to follow the operation.

Even when not at the orifice, but felt externally some way within the canal under the skin, should the calculus not be large, some dexterous manipulation might force it onward into the mouth. As it but seldom happens, however, that our attention is drawn to it before its bulk is such as to preclude the possibility of stirring it, we are in general necessitated to incise the duct in order to extract it. And in making our incision, we are to do it cautiously, in the direction of the canal, from one extremity to the other of the tumor; and, as soon as we have extracted the calculus, either with our fingers or forceps, take special care to approximate the lips of the wound and retain them in apposition by some adhesive plaster, lest we incur the consequences

of a fistulous duct, which sometimes amounts to an evil as great as, or even greater than, the calculus itself had proved. In some cases sutures may be found requisite. A compress will generally with advantage be applied upon the portion of duct intervening between its gland and the wound. A great consideration in the treatment is, to keep the jaws as quiet as possible; and therefore the horse ought to be supported for some days upon liquid aliment. Although it is right to take such precautions, many of these wounds heal and do well with comparatively little care. M. Vieillard extracted salivary calculi from three troop-horses without leaving any fistula. And M. Girard has seen the gland itself cut into for the purpose of evacuating a salivary abscess, and afterwards complete cicatrization ensue.

This account is followed by the relation of several cases illustrative of what has been said, whose insertion here would prove of little or no service to us.

STRICTURE OF THE ŒSOPHAGUS.

By *stricture* is meant, a diminished or contracted state of some tube or duct of the body. In man, we find strictures occurring in all the mucous canals—œsophagus, intestines, urethra, vagina: in the horse they have hitherto been discovered in no others, I believe, but the œsophagus and intestines. A stricture is either *spasmodic* or *organic*: that is, the muscular or contractile power of the tube only is at fault, and that is functional; or else, its lining membrane is thickened, and perhaps altered in texture as well. The stricture I am going to treat on will be found to be of the organic kind. Its occurrence is rare; at least I argue so, from having myself come to the knowledge of but four instances of it. A case of it in a cow is related in 'THE VETERINARIAN' for June, 1843.

THE SYMPTOMS of a strictured œsophagus, so far as I have been enabled to note them, are, at first, a gradual falling off in strength and spirits and appetite, with some attendant febrile disorder; cudging not only hay, but corn likewise,

and ejecting both, either through the nose as well as mouth, or through the mouth alone, after they have been thoroughly masticated and mingled with saliva, and rendered, in fact, fit to be swallowed. In some cases the disgorged cud does not seem to have entered the œsophagus at all: the animal, knowing he cannot swallow, appears not to attempt it. In other cases, the cud descends as low down into the gullet as the seat of stricture, and there lodges until disgorged again, causing distension of the tube at that part, and, in time, the formation of a considerable dilatation or sac. Now that the horse disgorges the greater part or whole of the solid food he consumes, the appetite, from having been indifferent, becomes painfully keen: no sooner is a fresh supply of provender set before the animal than he seizes and devours it for a time with avidity; but, alas! this proves in the end only the means of augmenting his suffering; for, as soon as he has swallowed it, or a few minutes or more afterwards, he discovers his inability, or rather the pain and difficulty he is about to experience in further deglutition; and consequently prefers returning most, if not all, of what he has been chewing, into his manger. At this period, he becomes, in some instances, restless and agitated, breathes hard and quick, and evinces spasmodic action commencing in the tube by striking his belly, pawing, lying down and rising, &c., so long at least as the inverted action is going on. Deprived of his aliment, the animal daily continues to lose flesh, and with it his strength and spirits, everything around appearing after a time indifferent to him, save his fresh feeds, which he plucks up to eat with renewed vigour, only, however, to encounter renewed disappointment, and perhaps paroxysms of annoyance and agitation, and pain as well. There exists in general no unwillingness nor impediment to his swallowing his water; nor are balls even, during the early stages of the disease, rejected. His skin, after a time, becomes hide-bound; his coat harsh and dry and scurfy. Early in the complaint, the bowels are commonly much constipated, and require repeated aperients to keep them soluble: later, a diarrhœa is apt to supervene. A slow fever

accompanies these symptoms: the pulse commonly ranging between 50 and 60. The horse lies down sometimes by day as well as by night. Emaciation proceeds, until, from debility and inanition, the exhausted animal sinks to rise no more.

THE SEAT OF STRICTURE varies. In two cases which occurred in my own practice, it proved to be the place where the œsophagus enters the stomach—in the *cardia*. My friend, Mr. King, of Stanmore, related a case to me, in which he fancied there existed a stricture in the *middle* of the canal. A very interesting case, published in 'THE VETERINARIAN' for 1830, by Mr. Cheetham, of Glasgow, leaves no doubt on this point, and throws fresh light on several others.

Mr. Nice, V.S., Dockhead, sent an account of a case he had attended to Mr. Sewell, which will be found in the 'Transactions of the Veterinarian Medical Association.' The symptoms were, that the horse usually fed about five or seven minutes at a time, without any inconvenience, when he would become restless, and exhibit hurried breathing, and spasmodic action in the œsophagus, during which, regurgitation of food took place through the nostrils. At this time he would strike his belly, and lay down, and rise, &c. after which he would continue quiet until feeding recommenced. He gradually lost his condition. The stricture was found, post-mortem, about one inch and a half above the cardiac orifice: the little finger could hardly pass through it. The œsophagus was very much thickened around the strictured part, while the muscular fibres, both longitudinal and circular, were considerably disgregated, depriving them of much of their normal action over the dilated sac. Some of the aliment seemed to find its way into the stomach, which for awhile sustained him.

Mr. Cheetham was called to attend a mare belonging to an officer of the 4th Dragoon Guards. She discharged masticated food from the nose; and on the near side of the neck there was a swelling, in the situation of the œsophagus, as large as a person's arm, commencing about six inches

from the pharynx, and gradually increasing to opposite the sixth cervical vertebra, and there terminating abruptly. There had existed a partial obstruction for many months, which had so increased of late, that the animal had been obliged to be drenched with water to wash down the contents of the sac: on other occasions a probang had been used. After such palliations as these, a blister was applied over the tumor, and she was turned to grass. While there, it was observed that food, lodged in the sac of the œsophagus, was frequently returned into the mouth, and afterwards re-swallowed, and then passed into the stomach. On being taken from grass, a quantity of corn was given to her, in order to ascertain if the stoppage still existed. The corn accumulated the same as before. Mr. Cheetham determined on an operation. He made an incision four inches long into the œsophagus, opposite the sixth cervical vertebra. The tube seemed divested of its muscular fibres, and was composed of cuticular coat alone. The contents of the sac were removed, and she was drenched with warm water to wash out the œsophagus. The sac appeared three or four inches in diameter; but the opening leading from it, below, was so contracted, that it only admitted a probang half an inch in diameter. After the operation the mare drank freely of warm water, which, by applying pressure upon the wound, passed uninterruptedly into the stomach, though without the pressure the greater part escaped. She was bled, and had an aperient. The wound was fomented, and poulticed, and dressed, and the mare partook freely of gruel. Some sloughing followed, which brought away part of the œsophagus, after which the wound became healthy. Mr. Cheetham now introduced a probang, of the dimensions of the first he used, through the stricture; which operation he repeated twice or thrice a day for ten successive days, with probangs of larger size. Thus was the stricture—which appeared to have been seated at the place where the tube enters the chest—overcome; and since then the probang has been occasionally introduced by the owner himself. To assist the mare in swallowing, the sac was aided in its action by

pressure, accomplished by a broad breast-plate, furnished with a pad. The sac gradually grew less; and the mare at length became enabled to consume her rations, and soon after recovered all her life and gaiety.

THE APPEARANCE OF THE CARDIAC STRICTURE is this—The Œsophageal orifice at the stomach is contracted to the utmost degree: in one of my cases, a sharp-pointed instrument was with difficulty introduced. The muscular fibres surrounding the strictured part are sometimes prodigiously augmented in volume; though in other cases—as in Mr. Nice's—they are “disgregated,” and, so, enfeebled in power; and in addition there is a morbid thickening of their lining, arising from deposition into the cellular tissue interposed between the muscular and cuticular coats. The cuticular membrane is thrown into rugæ unusually large, and is evidently increased in substance. The stomach itself is not affected.

TREATMENT.—The two cases that came under my notice were not unmasked until death had afforded the opportunity of investigating their nature, and consequently were not submitted to any specific or appropriate treatment. Were I to encounter another, I should endeavour to pass a bougie, of proper size, as far as, or even into, the stomach, with a view of ascertaining the seat and nature of the obstruction; which, being ascertained to be stricture, might possibly admit of dilatation, or of the conveyance of caustic to it. Should, however, so long a passage for the bougie render it unavailable against the stricture, we must do as Mr. Cheetham did, make an incision through the neck into the Œsophagus, and pass the bougie or probang from thence. A *cardiac* stricture would, of necessity, prove a very troublesome, perhaps an intractable, affair: one within the neck, or even the chest, might admit of being overcome.

RUPTURE OF THE ŒSOPHAGUS.

This is a lesion we can hardly look for save from violence or injury of some kind. Mr. Cartwright relates a case of it in ‘THE VETERINARIAN,’ vol. xxv, p. 545. He was called to

a mare to whom the groom had been attempting to give a diuretic ball, without succeeding, who would neither eat nor swallow, but seemed as if choking, drawing her head towards her breast and retching, with spasmodic action of the neck, &c. No obstruction nor enlargement could be discovered. She retched and coughed occasionally. A sheep probang introduced stopped at one third of the neck. Water poured into her mouth in part went down, though most of it returned. Attempted to give gruel, but this produced spasm and retching. The mare lived eight days. "From eight to ten inches of the upper portion of the œsophagus was found very dark-coloured and thickened; was, in fact, a mass of decomposed muscle and cellular tissue, in the interior of which was a cavity eight inches long: the opening into it commencing superiorly over the larynx, and proceeding into the muscular substance of the superior part of the œsophagus. It had evidently been made with some sharp or rough instrument. The remainder of the tube was normal."

Mr. Cartwright remarks, in regard to the case: "From this rare case we may learn, that the symptoms of such an injury are not of that violent nature as when there is mechanical obstruction. This mare lived ten days without swallowing more, I should think, than a quart or two of water or gruel; and I fancy she gained little nourishment from the clysters, as they were frequently ejected after being given. Now, what produced the injury? The groom acknowledges that he had been giving a ball the day before, unknown to his master, but he flatly denies having given it upon the end of a stick. It is very certain that, if it was not done by such means, *it was wilfully done by some one.*

CHOKING.

Every now and then it happens that a portion of food, or some solid body, becomes lodged within the pharynx or œsophagus, without the horse possessing the power either of swallowing or disgorging it. Grain, small potatoes, pieces of turnip or carrot, a ball of large size or hard consistence

or improper shape, even an egg, have all of them proved causes of obstruction. In vol. xvii of 'THE VETERINARIAN,' Mr. Tennant mentions a case in which grass "well-masticated," had become firmly impacted and formed the obstruction. Horses, voracious feeders, are very apt in their avidity to bolt their corn whole, and gulp it down so rapidly that the successive portions, instead of passing on into the stomach, accumulate within the gullet, and block up its canal. Only a small collection, or else a large and expanded one, may in this manner arise before the animal feels or expresses uneasiness. All at once he leaves off feeding. Next, he makes every effort in his power to complete his imperfect swallow, and gulp down the cause of his distress. Should he not succeed, his throat and neck become, through his gulping and ineffectual efforts at deglutition, spasmodically drawn up; and probably he gives every now and then a loud shriek, no less expressive of his own anguish than excitive of the sympathy of those around him. Should he attempt to swallow water, the fluid, together with a quantity of thick ropy saliva collected in his mouth, returns through his nostrils. There do occur cases, however, in which such notably characteristic signs are not met with, or, at least, are not present at the time we happen to be called in; and there may exist reasons on the part of those in attendance for concealing what has passed from us. The refusal of food, with symptoms of apparent sore throat, connected with circumstances of a suspicious nature, are enough to induce us to scrutinise the pharynx and œsophagus well with our fingers, in order to detect any tumor or prominence that may exist; we may also give the animal water, with a view of ascertaining whether there be obstruction of any sort or not. Should the fluid be ejected through the nose, we are warranted in introducing a probang; than which, in case the obstructing body lie below the neck, we possess no other means so sure of discovering its seat, or any so ready of removing it, even in any situation. A probang, however, is an instrument in the possession of professional persons only, and one, even with them, which often happens to be at home

at the moment it is wanted, and therefore is one which one is frequently forced to seek a substitute for. A professional friend of mine has told me, he has on several occasions, when the obstruction has existed in the throat, succeeded with the butt-end of a waggon whip. Cavalry people might have recourse to a rough-rider's whip. A stout cane of any sort might answer the purpose. Whatever is to be or can be had, no time is to be lost. A draught of water is sometimes effectual; though the probang is, after all, the proper thing to be had recourse to. And in the selection of his probang let the practitioner bear in mind the very pertinent practical remark of Mr. Cartwright, when he says:¹ "As the œsophagus of the horse is considerably less than that of a cow, it is highly important to veterinarians to have by them various sized probangs, and such as are pretty elastic, so as to give the necessary curve about the larynx." For a very interesting paper on this subject, published in 'THE VETERINARIAN,' the profession are indebted to Mr. King, of Stanmore.

Mr. KING observes, that choking is common among old horses whose grinders are imperfect, and whose keen appetites incite them to bolt their corn. He has seen the œsophagus in this manner distended "almost from the stomach to the throat:" a case in which recovery is very rare. Mr. King's practice is to pour down fluids, and press and squeeze the œsophagus, with the view of commingling the liquid introduced with the masses of corn; and thus, by manipulation, has he occasionally succeeded.

The following case shows how much a practitioner may be led astray by false or imperfect accounts:—

Some years ago Mr. King was called to a horse belonging to a coach proprietor. The owner said his horse "had a bad sore throat, and could not swallow." Mr. King examined the throat and gullet, but, finding nothing, suspected nothing. The horse was blistered and drenched; but the liquids all returned, no effort being made to swallow them. The animal died: and, on examination, was found, within

¹ In his account of a case of 'Laceration of the Œsophagus,' in the 'Veterinarian,' vol. xxx, p. 548.

the thoracic portion of the œsophagus, a ball composed of the ashes of tobacco, enveloped in double paper. At first, all knowledge concerning this discovery was stoutly denied; but afterwards a confession came, that the ball had been administered for worms. Had not such delusion been practised, the probang would have been used, and, Mr. King thinks, might have proved effectual.

Mr. King also observes, there is a notion abroad that new-laid eggs will improve the condition of horses; and the practice is, to administer them with the shell only starred in a few places: a practice that has in some instances been the means of choking the animal.

Mr. King was once called to a horse with a reported "sore throat." The groom *swore* he knew no cause for it. Mr. King, however, had reasons for entertaining doubts of the man's veracity, and therefore proceeded at once to pass a probang. On the return of the instrument, the bulb was found covered with fragments of egg-shell. The horse speedily recovered. Mr. King has had related to him, on good authority, two similar cases in cattle practice.

The following irremediable and fatal case of the same description occurred to Mr. T. Cooper, V.S., Coleshill.

In December, 1834, Mr. Cooper was called to Dunton Hall, to a bay horse that was taken suddenly unwell. Mr. Cooper found the animal "coughing violently, and stamping with his fore feet; with saliva running from his mouth, which he occasionally attempted to swallow, though the greater part returned through his nostrils." It was evident there was obstruction. The horse had been eating Swedish turnips. Mr. Cooper passed a whalebone down the œsophagus, "and a rounded substance could be distinctly seen driven before it. The horse after this appeared to be relieved: he ate some hay and drank some water, and was left for the night." Next day he was much worse. "He does not cough, but heaves very much at the flank; refuses all food and drink; is dejected; saliva with mucus runs from his nose, and much of it he swallows." He was bled; took an aperient with digitalis; and his throat was blistered, from a notion that "the sub-

stance might have injured his throat." Third day: much the same. "Takes gruel from a bottle, but will not eat." Mr. Cooper from the first had no hope of saving him, and early next morning he died. On dissection, a large sized hen's egg, *entirely whole*, was found firmly impacted in the œsophagus, within a few inches of its cardiac termination; the parietes of the tube around the egg being "much dilated, and ulcerated nearly through." The groom confessed he had given the egg a few hours before Mr. Cooper was sent for, with a view of improving the horse's condition. The balls which had been given must have passed the egg in a liquid state, probably along with the gruel.—VETERINARIAN, 1835.

MR. GEORGE HOLMES, V.S., Thirst, Yorkshire, has, in 'THE VETERINARIAN' for 1839, detailed a case of much interest, no less from its pressingly dangerous tendency than from the prompt and judicious manner in which he treated it.

Mr. H. was sent for in great haste to Ashbury House, to a horse in a most distressing state, "breathing with the greatest difficulty, heaving violently at the flanks, with the countenance exhibiting an expression of the intensest agony. He was foaming at the mouth, his ears were cold, and, in fact, it was evident that, unless instant relief were afforded, he must die; since a ball had been given a little while before, which had stuck in his throat." Mr. H. could detect no ball in the œsophagus: he was convinced it was in the fauces, or pressing against the larynx; but the violent heaving, and the instant suffocation that threatened when he was moved, precluded any attempt to pass the probang. Mr. H. therefore determined on immediate tracheotomy. This gave instant, but very far from permanent relief. After a short interval Mr. H. endeavoured to pass the probang, and, after repeated attempts, succeeded in removing the ball. The horse was then bled, and had an aperient ball. Still he breathed high, and his pulse was 100: he was, therefore, bled again, and took two scruples of opium, with the same quantity of digitalis: this admirably allayed the irritation. Fifteen hours after, all was going on well.

These occurrences are exceeding rare in army practice. I can charge my memory but with one such a case; and that originated in some one having clandestinely given the horse an entire potato to eat. I attribute this exemption to three causes. First, to cavalry horses being fed four times a day, and not being allowed above a quatern of oats at a time. Secondly, to no roots or hard substances whatever being given them for food. Thirdly, to the balls which are exhibited being such as are fresh compounded, and consequently not hard. The shape of the ball is also a consideration.¹

I quite agree with Mr. King, that, in combination with the probang, the patent stomach syringe should be employed in these cases, and no doubt might be with very great service. The probang we use ought to be a perforated or tubular one, through which, when introduced, liquids might be injected without the trouble and loss of time of a fresh introduction.

ŒSOPHAGOTOMY.

When the means detailed under the head of "Choking" prove ineffectual for the removal of the foreign body—whatever it may be—obstructing the canal of the œsophagus, the operation of cutting into the tube, called *œsophagotomy*, must be our resource; unless it happen that the obstruction be below the neck, within the chest, and then no knife can possibly reach it. The same operation may likewise be practised with a view of overcoming impermeable stricture, or for the purpose of injecting medicinal or alimentary matters into the stomach when there is no possibility of introducing them through the mouth. In the hands of a veterinary anatomist there is nothing to dread in the performance of œsophagotomy; although, from the œsophagus lying behind the windpipe, and much deeper seated, and there being the jugular veins and carotid arteries, and par vagum, and sympathetic and recurrent nerves, along the sides of the trachea,

¹ Vol. i, p. 47.

the scalpel requires to be handled with considerable caution as well as skill. Recollecting that the œsophagus, after proceeding down one third of the neck, inclines to the left of the trachea, and before it reaches the chest gets quite round to the left of that tube, had we our choice, we should undoubtedly select the *left* side of the neck, and below the upper third of it, for the operation. Supposing we take the middle of the neck, our first incision—on which much of our ultimate success will depend—should be three inches in length, and be directed along the inferior border of the jugular vein; which vessel had better be kept distended the while by pressure from the hand of an assistant. The lips of the wound being then kept apart by the assistant, the operator carefully prosecutes his dissection through the cellular tissue with which this hollow abounds, keeping his knife from wounding the jugular on his right, and guarding against the carotid artery and nerves which lie enveloped in the cellular substance contiguous to the windpipe, whose situation he will best ascertain by feeling for the pulsations of the artery. His object now is to get behind the carotid, and there to feel for the windpipe; and this being found, will guide him to a firm, chordiform, shining, red substance, in close apposition with it, which is the œsophagus. In case any injection into it be required, the œsophagus must be drawn forward with a blunt hook, and opened by a longitudinal incision, and an appropriate tube introduced. But where the extraction of a foreign body is our object—a circumstance that will render the operation much more facile, the tumor being our guide for incision,—nothing remains to be done, after this exposure, but to liberate the imprisoned substance, whatever it may be, and afterwards to close the wound in the œsophagus with a common continued suture of silk-thread, and unite the lips of the external wound with pins and tow twisted round them, in the same manner as the wound after bleeding is closed; or, if preferred, the zinc wire suture may be employed. Lastly, a compress upon the wound, confined by a roller round the neck, will give support, and for a day or two, perhaps, be found serviceable.

During the healing of the wound the animal's diet ought to be liquid, or nearly so : gruel, thick and nutritive, and boiled roots, with mashes of various liquid-like aliment ; chopped green meat of any soft and succulent kind, and short-cut grass are also admissible.

Sometimes it happens, when we come to operate, that the mucous lining of the tube proves to be ruptured or ulcerated through, on the back side of the obstructing body, and perhaps too in front, and becomes detached from the muscular coat, owing, in the first instance, to extreme distension. This renders the case exceeding troublesome, and even dangerous, to manage, and now and then proves the cause of dissolution. An instance of this is related in 'THE VETERINARIAN,' vol. XVII, p. 36.

The following case is well worth attention, on account of its showing what may be sometimes effected by simple manipulation, without going to the extremity of laying open the œsophagus.

Mr. King was summoned to a horse that had had a ball administered to him by the groom, wrapped up in writing paper ; since which he had ejected everything he had eaten or drunk. Mr. King discovered a prominence in the neck, a little above its middle, and tried all means to force the obstructing body onwards ; but without avail. At length Mr. King determined on cutting down upon the œsophagus ; having done which, without opening the tube, he found the obstruction arose from the lodgment of the ball the groom had given. Feeling the tumour soft and compressible, he squeezed and kneaded it with his fingers and thumb for some time, and then left it *in statu quo*. Shortly afterwards, the ball was by natural efforts carried down into the stomach, and liquids were taken, and readily passed. It was not for some time, however, that the animal became enabled to take solids into his stomach : whenever he swallowed them they were rejected through the mouth and nose the moment they had descended so low as the place where the ball had stopped. Mr. King thought that this must have been owing to the presence of a stricture, an opinion he conceived warrantable

from the circumstance of the ball being in itself but a small one, and of soft composition, and incapable of being stirred by the probang; and I think I may add, that this opinion has from Mr. Cheetham's case received additional probability.

SECTION X.

DISEASES OF THE STOMACH.

GORGED STOMACH.

[Commonly called *Stomach Staggers*.]

TYMPANITIC STOMACH.

RUPTURE.

INDIGESTION.

GASTRITIS AND POISONS.

BOTS.

GASTRIC CONCRETIONS.

GASTRIC POLYPUS.

PRELIMINARY OBSERVATIONS.

PLAIN and simple, and little varied, as the diet of the horse is, even in his domesticated state, one would think that his stomach could hardly experience disorder; and, in point of fact, from the *quality* of his food, in our country at least, it rarely does. But the stomach is liable to abuse from the *quantity* of aliment introduced: the domiciled animal being, so far, very much under the will and caprice of his master. The stomach of the horse, in comparison with the bulk of other viscera, and that of his body altogether, is remarkably small; the principal design of which appears to be, that it might not be capable of containing such a volume of alimentary matter as would, by its pressure against the diaphragm, prove an impediment to respiration, and thus render the animal either short-breathed, or physically incapacitated from sustaining exertion on a full stomach. The late Professor Coleman was wont, with truth, to observe, that the horse is the only animal that can or will exert himself after a full meal: the dog that has been just fed will not hunt; a man is indisposed for work after dinner; but as for the horse, he often appears livelier after having consumed a quantity of food than he was before; and, whether he be in reality in a better or worse condition for work, leaves his stable not only with willingness, but even with alacrity and cheerfulness. One apparent, if not the principal, reason for which is, I repeat, that he possesses a *small* stomach.

Since, then, the horse's stomach contains less, it is only

reasonable to suppose that it will require to be filled oftener, than the stomach of other animals. If a dog be fed once, or at most twice, within the twenty-four hours, he thrives and is satisfied. But a horse is not satisfied, nor will he thrive and do well, unless he be feeding three parts of his time. A horse at grass is observed constantly grazing: the cow and the sheep, at intervals, lie down for hours together to ruminate; but the horse, not a ruminating animal, seldom, if ever, is seen lying, he is almost always pasturing: not ceasing when he has filled his stomach, like a man or a dog, but continuing to feed all day long. In the stable it is usual to feed a horse three or four times a day with corn, and twice or thrice with hay or rack-meat: the corn he speedily consumes, but the hay occupies him many hours; and, unless he have sufficient to engage most of his time, he is very likely to set about eating his litter. For, however nutritious his food may be, we learn by experience that *quality* will not prove a substitute for *quantity*.

By the laws of physiology, we cannot on a sudden change the natural habits of an animal, or even of any one of his constituent organs, for fresh ones, without the risk of entailing disease on that animal or organ: although we may, by degrees, introduce alterations which become so confirmed by time and usage as in their turn to constitute in effect the ordinary and natural habits. "Habit is second nature," and long continued, will usurp the place of nature itself; on which principle alone can we account for the general healthiness of the horse's stomach, knowing, as we do, how much his natural habits are altered by art. How often do we see horses—hunters especially—taken to work at eight or nine o'clock in the morning, and not returned to their stables before five, six, or seven o'clock at night; and yet how rarely is it that we hear of ill consequences from all this. I believe, myself, that well-bred horses will endure long fasting and subsequent repletion with more impunity than coarse-bred ones and cart-horses: at least, many instances have come to my knowledge of stomach-staggers occurring in the latter, but very few in the former.

GORGED STOMACH :

Usually denominated Stomach Staggers.

By "gorged" is meant that state of excessive plentitude and distension in which the stomach loses all power of contracting upon its contents. We have no evidence that the stomach sustains any positive or direct harm from long fasting; but from subsequent and sudden repletion it is liable to be put into a condition of the greatest danger: on which account it behoves us to be cautious how we feed horses who have gone long without food, and have returned home with ravenous appetites. Instead of filling their mangers with corn and chaff, and other provender capable of being bolted whole, we should give them but a very moderate allowance of manger-meat, and rather endeavour to appease their sharpened appetites by hay and other food which requires a degree of mastication, so as to afford the stomach time for performing its duty in digestion, and of ridding itself of part of its contents before sufficient aliment be swallowed to distend it beyond its powers. For, as Gibson has truly enough observed, if a man over-fills his stomach, he has a chance of relieving himself by vomiting, and so "getting rid of his enemy:" an alternative more prompt and facile still in a dog; but as for a horse, who has "no natural disposition to vomit, the only chance he has of relief is "passage downward." An instructive account of the effects of fasting and subsequent repletion used to be given by Professor Coleman in his lectures.

The Professor was consulted about some horses, among whom had occurred a strange and unaccountable fatality. On inquiry, he found that the custom of the establishment was, to keep their horses out at work for ten hours together without food, and to feed them in abundance on their return home. The source of the evil at once became evident. The Professor ordered, for the time to come, that the horses be fed once in the course of the time they were out, by means of nose-bags; and the fresh practice immediately put to flight a disease which had proved the cause of death of several of them.

The same disease has often made its appearance in breweries where horses were in the habit of being kept out many hours without food, and on return to their stables too abundantly supplied with corn and chaff, or roots, or other manger-meat. Wagon and cart-horses are, unless well looked after by their proprietors, apt to become, out of mistaken kindness, stuffed, even to death, by their men. "Wagoners," says Mr. Tombs, V.S., Stratford-on-Avon, "are so sceptical and profoundly ignorant, that they think, unless a horse's bowels be filled out so as to be on a level with his hip bones, they have a mean appearance, and are not capable of a hard day's work. No persuasion can root out the strong prejudices of wagoners in regard to feeding horses." [*VETERINARIAN*, vol. xxv, p. 437.] The conductors of such establishments, however, are grown wiser in this respect. Nowadays, it is seldom we see drays or wagons going out without carrying with them feeds for their horses. Again, such cases are of most rare occurrence in the army. Why are they so? Simply because the cavalry feed their horses in stables, four times a day; and when in the field are always furnished with nose-bags or small corn sacks; which, in fact, constitute part of a dragoon's kit.

Mr. Kent, V.S., Bristol, remarks in regard to this disease—"From what I have seen, I am of opinion that, in those districts where farm-horses are kept on vetches during summer, more horses die during July and August from stomach staggers and inflammation of the bowels than during the other ten months of the year."¹

SYMPTOMS.—A stomach simply surcharged with food, without any accompanying tympanitic distension, does not appear to occasion local pain, but to operate rather that kind of influence upon the brain which gives rise to symptoms, not stomachic, but cerebral: hence the analogy between this disease and staggers, and hence the appellation for it of "*stomach staggers*." The unnaturally filled stomach produces, for the first time, a sense of satiety: the horse grows heavy and drowsy, reposes his head upon the manger,

In a 'Case of Stomach Staggers,' in the '*Veterinarian*,' vol. xiv, p. 670.

falls asleep, and makes a stertorous noise. All at once he rouses from his lethargy, and violently thrusts his head against the rack or wall of the stable, or any thing, in fact, that happens to oppose him, owing, seemingly, to some strange sensation felt in his head, and in this posture paws with his fore feet, or performs the same action with them as he would were he actually trotting: evidently all the while unconscious of what he is about. His eye, which at first was full of drowsiness, now acquires a wild unmeaning stare, or has already become dilated and insensible to light. The respiration is tardy and oppressed; the pulse slow and sluggish. The excretions commonly diminished. The bowels are constipated.

Cases there are in which the animal experiences a good deal of uneasiness, and even pain. The horse, in his gait, reels or swings about, and either manifests extreme heaviness and dejection, or exhibits symptoms of pain, with which sometimes he is seized with purgation, as though he had got rid of his distension of stomach, and had become seized with gastric irritation.

The DIAGNOSIS must be carefully sought after by making every inquiry into the *history* of the case: knowing that similar symptoms may proceed from an affection of the brain itself, it is only in this manner that we are likely to fix upon the true seat of disease. The circumstance of the horse having gone long without food and afterwards receiving an abundant supply; or of his being so situated that he has had an opportunity of glutting himself, and, being a voracious feeder, would be sure to do it, would constitute a tolerably unerring director to the stomach in forming a correct diagnosis.

The PROGNOSIS offers but little hope. Unless we can hit upon, and put into immediate practice, some operation for relieving the stomach of its burthen, fermentation will take place, gaseous distension follow, and rupture be likely to terminate the case.

The TREATMENT must, therefore, rest upon the means we possess or can devise of relieving the stomach. Can we vomit

the horse? Not, I am afraid, with any certainty or effect. The stomach of the horse has been known to relieve itself in this way; but then its contents have been thrown into the chambers of the nose as well as mouth, and so endangered life by suffocation. There is, however, yet another mode of attempting to accomplish the same end, and that is, by endeavouring to pass a hollow elastic tube down the œsophagus, into the stomach, and through it, by means of the stomach-pump, injecting tepid water. The best medicine to administer seems to be aloes in solution. The decoct. aloës, in combination with æther, is a good formula providing it be given in such a full dose as will not fail, should time be allowed it, to produce a cathartic effect. The state of the brain may render it advisable to draw blood; while we shall assist the bowels in unloading themselves by the administration of copious and stimulating clysters.

A case is given in 'THE VETERINARIAN,' vol. xxi, wherein the fumes of æther were inhaled with seeming benefit. In the absence of any apparatus for the purpose, a linen bag was procured with a slip-knot around its aperture, by which it might be closely fitted to the muzzle; and in this was placed a large sponge, within a wooden bowl, upon which æther was poured in sufficient quantity to saturate it. It was precisely ten o'clock when the animal's head was enveloped around the muzzle in the æther bag; at a quarter past ten, both motion and sensibility had become momentarily annihilated: the animal fell at once upon all four legs, and sunk to the ground (to appearance) a lifeless mass.* The æther was administered four times afterwards, and the animal in the end recovered.

TYMPANITIC STOMACH.

This is a disease in which the stomach or intestines, or both, become highly distended with air; or, at least, in which gas, in addition to any alimentary matters they may contain, is the principal cause of the distension. In cows; this inflated condition of the *rumen* or paunch it is which con-

stitutes the disorder in them called *hove* or *hoven*, or *blown*; the ordinary cause of which is overloading the paunch with young, succulent, growing herbage, in particular clover, from whose subsequent fermentation gas is liberated in such volumes that the animal's body becomes tympanitic to a most enormous degree. In the horse, however, who has no *rumen*, veritable hove is a rare occurrence; though it is by no means uncommon to find him the subject of tympany or wind-colic. I never, probably, shall see again so many blown or hoven horses as I witnessed in the march of the British army from Waterloo to Paris, in 1815. A brigade of horses had been allowed to feed in a field of growing wheat, and the consequences were, that several among them swelled in body, turned almost frantic with pain, and shortly died. In the stable, tympany is of rare occurrence; unless it be in crib-biters, who are suffered to pass their time in sucking in air; and in them the complaint is common enough. Such horses will gulp down air until their bellies become swollen to a great extent; they will then, from experiencing some uneasiness, begin to paw and strike with their fore feet, and lay down and roll, and rise again, as if they were suffering from gripes. Their complaint is manifest enough, and rarely requires anything beyond a good smart trot; the usual effect of which is, to cause the expulsion of wind, and more or less dung along with it, *per anum*. Cases, however, have occurred to me, the subjects of which were not crib-biters, and yet there was that degree of virulence and obstinacy in their symptoms which appeared to warrant the opinion, that there existed something beyond ordinary spasms or gripes, whereto the symptoms were in all other respects similar. One of these I will here relate.

A young mare was admitted, Sept. 1824, into the Royal Horse Infirmary at Woolwich, for "gripes." A gallon of blood had been abstracted prior to her admission. The symptoms were of the most violent and alarming description. She sweated profusely from paroxysms of agonizing pain, worked hard and quick at the flanks, and had a thready and almost imperceptible pulse. The following

drench was prescribed to be given immediately:—Tinct. opii et ol. terebinth. āā ʒiij. decoct. aloës ʒvj. M. In the course of half an hour this was repeated: but shortly after she vomited the greater part of it by the mouth and nostrils. No relief having been obtained, ℥xii of blood were taken from her, and the following drink given: Tinct. opii ʒiv. decoct. aloës ʒxij, ol. carui ʒss. M. A stimulating embrocation was also rubbed upon the belly, and large and frequent clysters injected. In another hour this drench was repeated; and for the fourth time, during the succeeding hour; both of which, before death, she rejected as she had done the second drink. Notwithstanding these active measures were promptly taken, she died about three hours after her admission. Having opened her, we found the stomach prodigiously distended with air: it was, at least, three times its ordinary size. When punctured, it subsided to about two thirds of its former bulk. It contained masticated oats and hay, swimming in a greenish yellow fluid, which emitted an offensive odour.

The extraordinary degree of suffering manifested in these cases; their resistance to all ordinary remedies; combined with perceptible enlargement of the belly, and its evident tympanitic character, with resonance on percussion; with eructations and vomiting besides; may serve to distinguish them from spasmodic colic or gripes. And, supposing we have been enabled to do so, then comes the question, what is to be done by way of

TREATMENT?—Medicine does not seem to offer anything in the shape of a remedy: the most potent antispasmodics, and stimulants, and purges, I have given with no avail. In cattle so affected, the late Mr. Youatt recommended chlorinated lime, in doses from ʒij to ʒiv: the compound resulting from combination of which with the contents of the stomach is hydro-chlorate of lime, which quickly undergoes solution. Would the introduction of œsophagus-tube into the stomach prove practicable, and turn out of any service? Would the practitioner be justified in plunging a trocar into the abdomen, the same as is done to cattle, though the cases, or at

least the subjects, are entirely different? Three French veterinarians—Barrier, Herouard, and Farfouillon—are said to have performed this operation, and with success. The place they chose for puncture was the middle of the right flank, thereabouts being the region of the cæcum and colon; though in one case the *left* side also was penetrated. Should the stomach alone prove the seat of this disorder, it is obvious that the operation so practised must fail. The question in that case would be, can we reach the stomach itself with a trocar; and if that be practicable, how far would it be safe to puncture it? One French veterinarian proposes we should make use of a curved trocar of extraordinary length for the purpose.

Should the practitioner determine on such an operation—and certainly the case of tympany, unrelievable by other means, appears to justify such determination—I would counsel him to employ a trocar not only a great deal longer than is used in the case of hydrothorax, but likewise of smaller caliber, and at the part he perforates, to draw aside the skin as much as he can, so as to make his opening a valvular one. If the trocar be not an unusually long one, it will be apt to slip out of the stomach or intestine the moment the latter subsides and recedes from the parietes.

Since these observations were penned, the operation of trocaring the abdomen has been practised on our own side of the water by Mr. Stewart, Andersonian Veterinary Professor, Glasgow. In a mare, whose case resembled colic, and in whom there was much tympanitic swelling of the belly with poignant pain, which medicine and other means had failed in relieving, Mr. Stewart thrust a hydrocele trocar into the middle of the right flank. A large quantity of air escaped, and the intestine was soon emptied. Although so much air escaped, however, the abdomen did not appear to have been diminished. Mr. Stewart then made another puncture, lower down, into the cæcum—it might be the colon, for in these cases the bowels never hardly occupy their ordinary relative positions. He was guided in his choice of place by percussion. On withdrawing the perforator, the

air rushed through the canula with great rapidity and noise. The mare hastened its expulsion by frequently straining. The canula, as the current diminished in force, was several times plugged up by stercoraceous matters, which were from time to time removed with a probe: at the last a few drops of fluid came away. The belly appeared reduced to its natural volume, and was quite flaccid after the operation. The mare lay for nearly three hours without a struggle. Mr. Stewart sat up with her, having resolved to puncture again should it become necessary, and to introduce some hydrocyanic acid through the canula into the intestine. From this time she continued going on well. On the third day afterwards, however, she had a mild cathartic, and was then dismissed to her own stable.—[‘VETERINARIAN’ for 1836.]

The mare continued doing well for ten or fourteen days. After that time she ceased to improve, and the groom complained she would not suffer pressure on the right flank. When examined, tenderness thereabouts was very apparent; though there was neither heat nor swelling. Neither stimulants nor a blister did any good. The mare remained thin and weak, and dejected. There was some mischief going in the right flank; but whether from the trocar or gaseous distension, must be left to conjecture. From the beginning of her illness the mare could not lie upon her right side; a fact Mr. Stewart mentioned in recording the case.

Mr. Stewart has made three other like experiments, from which he appears to be borne out in drawing the following inferences in regard to puncture of the belly:—

1st. That the operation of *paracentesis abdominis* is not likely to do any harm.

2dly. That when the small intestines are the seat of tympany, it is not likely to do any good. When much inflated, the small intestines change their relative position, and the gaseous pressure is such as to prevent an easy passage from one convolution to another. It is thus that the trocar empties only one convolution, and one convolution holds so little that its evacuation can afford no relief.—[‘VETERINARIAN’ for 1839.]

RUPTURE OF THE STOMACH.

This may be regarded as the natural termination of the case, continuing unrelieved, of gorged or tympanitic stomach. Up to 1824, the year I published the Second Part of my Veterinary Lectures, I had not seen a case of this lesion. Since then three have occurred in my own practice, and 'THE VETERINARIAN' has brought to light many others.

The CAUSE OF DISTENSION, and consequent rupture, may prove to be either *air* or *food*, or both. In one case, which I did not see until after death, the horse was known to be an inveterate crib-biter; and the post-mortem appearances were such as to render it most probable that his stomach had burst through the ingurgitation of air. In another case, surcharge with food had evidently produced the mischief. The horse—a trooper in the 1st Life Guards—naturally a ravenous feeder, had stood for eight and forty hours in the stable feeding upon hay and corn, and what litter he could pick up; and the consequence proved to be an attack, on the second night, of a fit of symptoms resembling colic, which, the next morning, was succeeded by cold sweats and tremors of body, quick and small and ultimately imperceptible pulse, convulsions, and death. The accident may happen at pasture, from the stomach becoming distended with grass, the same as is the case in hoven in cattle; of which an instance is related in 'THE VETERINARIAN' for 1834, by Mr. Firman Fuller, V.S., March. Another case is given in 'THE VETERINARIAN' for 1836, by Mr. Goodworth, V.S., Driffield, in which eating haws occasioned it.

COPIOUS DRAUGHTS OF WATER upon a full stomach may produce it: of this Dupuy mentions an instance in the 'Journal Pratique' for 1835.

BLOWS, FALLS, OR VIOLENT STRAINING, will be apt to occasion laceration at a time when the stomach is full.

Mr. W. C. Spooner, V.S., Southampton, relates the case,

in 'THE VETERINARIAN' for 1835, of a cart horse, who, after a hearty meal in the morning, was put to a wagon to go to Southampton. By the time he had got six miles, he appeared in much pain, and wanted to lie down. He was urged on three or four miles further, was then led into a stable, and had a drench given him, after which he was sent home behind the wagon. At this period Mr. Spooner saw him. There was a dark-coloured offensive fluid issuing from his nostrils; he was in a cold clammy sweat; his pulsation wholly imperceptible. Every now and then he would stretch out his fore legs, lean backwards and downwards, until his belly nearly touched the ground, and then rise up again with a groan, after which the fluid from his nostrils issued in increased quantity. In about twenty minutes after (during which he continued vomiting through his nostrils) he died in the greatest agonies. The stomach was found extensively ruptured. The horse was a ravenous feeder, and his diet mostly consisted of dry bran, which, on mixing with the liquid in the stomach, no doubt increased in bulk, and caused the rupture.

Mr. GOWING, V.S., London, in the course of a conversation I had with him on this subject, informed me that, in the course of about two years, he had had as many as ten or a dozen cases of ruptured stomach, and that they occurred for the most part in heavy horses, and particularly in such as were employed in heavy draught, and who were made to live principally on manger-meat, having their hay cut for them into chaff. Such of them as were ravenous feeders would swallow, and often bolt, food so prepared; which, from its undergoing imperfect mastication, would, in the stomach, be apt to run into fermentation, and generate gas, with which the organ becomes filled; and, in that condition, on any inordinate exertion of body, be extremely liable to burst.

HURTREL D'ARBOVAL gives the history of the case of a horse who, after making a full meal and drinking plentifully at a watering-place, happened to slip up upon his left side in returning to the stable, and, on recovering his legs, with great difficulty reached his stall.

Some time after he manifested symptoms of uneasiness and pain, stretching out his legs and arching his back, but appearing relieved by placing his fore limbs upon higher ground than his hind quarters. He was evidently experiencing great pain in his abdomen, and this appeared to be augmented by every movement he made, and by the least pressure of the hand upon the belly, which was perceptibly enlarged. Pulse slow and very small. At length, convulsions ensued; his neck became curved, and his head inverted between his fore legs; the pulse imperceptible; the respiration stertorous; upon which death quickly followed. The intestines were found distended with gas, and in general inflamed, as well as the peritoneum; and effused into the abdominal cavity were twenty pints of liquid, with some alimentary matters, of which latter there were also some between the folds of the omentum. Pyloric portion of the stomach empty; within the other was food, enveloped in mucous secretion. At one inch from the pylorus, extending to the middle of the great curvature, was a rupture through all the coats, eight inches in length, with borders thickened and blackish. The other viscera presented nothing noticeable.

LAFOSSE has given it as his opinion, that, most commonly, rupture follows some antecedent disease, some chronic inflammation; of which the following cases are adduced, by Dupuy, by way of proof:—

An entire horse died after a few hours of suffering from stomach-staggers. The stomach exhibited a rupture around its great curvature, near the pylorus. The peritoneal coat was more extensively torn than the muscular, the muscular than the internal. The omentum retained the extravasated aliments, and looked like the stomach itself. Liquid was effused into the cavities of the abdomen and pelvis. In opening the body of another entire horse that died after violent convulsions, the rent was found in the right sac of the stomach, along the great curvature, and close to the pylorus; its borders were irregular and bloody; the aperture in the peritoneum was less extensive than in the other

coats; several bowlsful of alimentary matters were taken out of the abdomen, of which some had reached the pelvis, and even the scrotum. A third, a harness horse, who died from stomach-staggers, presented the stomach torn in the same part as in the former case; added to which there was a rupture in the tendinous centre and left crus of the diaphragm. On opening an old mare, several pints of bloody effusion were found, in which floated alimentary matters, along with a detached shred of omentum. The right sac of the stomach showed an elliptical rent, seven inches in length, in a line with the great curvature. This horse, after having eaten voraciously, exhibited the symptoms of indigestion.

DUPUY has not confined himself, however, to the relation of these cases. He has shown a desire to account, in another way, for the accident occurring so frequently among horses. For it he mentions two causes—the increased friability of the tunics of the stomach under inflammation, and the practice of giving water after a full meal. The stomach not being made to hold more than twelve or thirteen quarts of fluid, if some two or three gallons of water be drunk after a full meal, the liquid imposes strain upon the coats, and the consequence is rupture. M. Dupuy has observed, in a horse that died of colic, the peritoneal coat lacerated, as well as a portion of the muscular, while the internal coat remained entire; although, had the animal survived, that likewise would have given way. For the rupture always happening in the *great curvature*, M. Dupuy accounts by referring to the change of position the stomach undergoes in becoming distended, and to the circumstance of the great curvature being the part least supported after that change has taken place.

Mr. DAWES mentions a case in 'THE VETERINARIAN,' (vol. xiii, p. 540), in which the rupture of the stomach appeared to be referable to gastritis. Mr. TURNER, V.S., Montreal, sent also an account to 'THE VETERINARIAN' (vol. xxii, p. 272), in which the stomach and the intestines too, exhibited signs of chronic disease, the latter having their

mucous coat much thickened, and containing "sundry pints of white matter," emitting an offensive smell.

Mr. WOODGER, V.S., London, relates an instance in 'THE VETERINARIAN' (vol. xii, p. 621), of intestinal calculus being indirectly the occasion of rupture of the stomach. The mare was attacked with gripes on the 12th of April. She was relieved, but had a relapse on the 14th, when she voided a calculus measuring 4 inches by 3. On the 17th, she experienced another relapse, of which she died. The stomach was found ruptured. Mr. Woodger remarks, "that the cause of the first attack arose from the passage of the calculus voided on the 14th;" and that the second was owing "to the stone left behind; had which been smooth, like the former, death might not have followed. It was the roughness of its sides, from portions having separated, that offered such an obstacle to its passage; and, from the violent manner in which she fell and plunged about, the stomach, probably being quite full at the time, gave way."

A PATHOGNOMONIC SYMPTOM of rupture in the alimentary canal is, according to Dupuy, the feeling, under the fingers, of repetition of convulsive movements—*tremors*—in the inferior coccygeal muscles. "Observation," adds D'Arboval, "must decide upon the value of this sign." Also, says the latter, but little confidence can be placed in any pathognomonic founded upon "particular attitude" or mode of expressing suffering. An occasional symptom of ruptured stomach is *vomiting*; and when present it may be said to be *pathognomonic*. It would appear to happen during the violent contractions of the stomach to relieve itself of distension; and be subsequent to, or perhaps synchronous with, the rupturing. *Crouching* with the hind limbs was observed in a case by Mr. Haycock. By some, sitting upon the haunches has been regarded as indicative of this or similar lesion.

DIAGNOSTIC.—From the circumstance of the extravasated matters having, in some cases, found their way into the sheath of the horse, it has become a question with Dupuy, whether the case might not be mistaken for one of

inguinal hernia. In doubt, he recommends that manual examination for hernia should take place in the manner prescribed.¹ "It is something," adds D'Arboval, "to steer clear of error;" although we still appear to have to regret that we possess no certain diagnostic of a lesion which, being necessarily fatal, would put a stop—the case being once finally decided upon—to all remedial proceedings.

There exist two cogent reasons for wishing to be able to pronounce at once upon a case of ruptured stomach: the first is, the preservation, if not enhancement, of the medical attendant's reputation; the second, the saving of solicitude on his part, and annoyance on the part of his patient, of administering anything under such hopeless circumstances. I remember the late Mr. John Field observing to me one day, that he never had witnessed a case of ruptured stomach without vomiting occurring prior to death, which he thought very remarkable. The trooper, however, of my regiment, who glutted himself with food over-night and died the following morning, did not exhibit this symptom: though very often present, it is not, therefore, one invariably so. The questions naturally arise here—Can vomiting take place *after* rupture? Would the *rent* stomach retain any power of ejection? Could ejection of the contents upward be produced by the abdominal muscles and diaphragm, *without* the aid of the stomach? I should very much doubt it. I should rather feel inclined to the opinion, that the act of vomiting should be taken as a proof of the entireness of the stomach. At all events, we may have rupture happen without vomiting; and, consequently, we must cease to regard that symptom as *alone* pathognomonic, though we may justly consider it, in company with others, as one throwing much light upon the nature of the case. Our guides, in the absence of any one infallible pathognomonic sign, must be—the history of the case; the subject of it; the circumstances attending it; the inflated or tympanitic condition of the abdomen; the symptoms of colic or gripes ceasing, and becoming succeeded by cold sweats

¹ Under 'Hernia,' which the reader can turn to.

and tremors; the pulse, from being quick and small, and thready, growing weak and more frequent, and, at length, running down and becoming altogether imperceptible; the countenance denoting gloom and despondency of the heaviest character; looking back at the flank and groaning; sometimes crouching with the hind quarters; with or without eructation and vomiting. I do not think that any peculiar or strange posture the animal may throw himself into in a fit of pain can be relied upon as worth much; and as for the agitation of the tail—which I suppose to be what Dupuy means by “*des mouvemens convulsifs des muscles coccygiens inférieurs*”—it is a symptom which so frequently portends extreme danger in other cases that I should imagine no especial import can be attached to it here.

INDIGESTION.

Though a word in everybody's mouth, *indigestion*, in a medical sense, is a phrase of such comprehensiveness that it becomes requisite for me to explain, prior to entering on the subject, what meaning it is my desire to have attached to it. By some physiologists, *digestion* is applied exclusively to the change the food undergoes within the stomach; by others, it is extended to every subsequent change the aliment experiences in the course of being reduced to its ultimate states of conversion, viz., *chyle* or nutritive matter, and *fæces* or innutritive matter. In man, whose digestive organs are in some respects differently constructed from those of horses, there is much reason for regarding the stomach as *the grand agent of digestion*; but in the horse, who is a graminivorous animal, one that is almost always feeding, and whose food is, for the most part, of a nature to occupy a large volume notwithstanding his stomach is in itself but small, the organ appears to do little towards the completion of the process, leaving much to be done after the alimentary matters have passed into the intestines. To say, therefore, that indigestion is owing to some fault in the stomach alone, is taking much too confined a view of the

case. Equally in error should we stand were we to hold the stomach altogether faultless: the only rational, or, at least, likely to prove useful, view we can take of the subject, is an extended and comprehensive one; so that, by a thorough scrutiny into *all* the circumstances of the case, we may have a better chance of fixing on the organ or part whose faulty action is deranging the process, and, by so doing, defeating its salutary end in the animal economy.

The comparatively short time the aliment continues within the stomach, and the much that remains to be performed to complete its digestion, after its passage into the intestines, accounts for the latter being oftener the seat of indigestion than the former; though, for all that, the stomach, as we have already seen, may, by being over-crammed with food or over-distended with air, become the seat of what may be regarded as the most dangerous of all kinds of indigestion. To exclude, however, these two conditions of stomach from our present inquiry, what I mean here by indigestion, is, the progress of food through the alimentary passages without its undergoing due or normal conversion; without, in fact, the animal deriving that benefit from it which it was natural or reasonable to expect.

The SYMPTOMS OF INDIGESTION—*chronic*, as the French writers call this, in contradistinction to the epithets *acute*, *gaseous*, and *vertiginous*, which they apply to the other kinds—though they clearly enough indicate that some one or other of the operations of digestion are faultily performed, are not in common such as will enable us to say in what precise part or organ the fault or defect lies. The horse does not thrive the same as other horses in the same stable, nor is he capable of the same work; though his appetite, so far from being impaired, may be even voracious. It may be fastidious—good at one time, indifferent at another. Sometimes it is depraved: the horse will gnaw, and perhaps eat, almost anything within his reach—dirt or stones; even a brick wall, and particularly the plaster or mortar from it; or his crib or rack, &c. His coat has an unhealthy aspect; it is what is called *pen-feathered* and arid,

and, perhaps, scurfy as well: nor is it shed at the usual season. He is likewise hide-bound. His dung has not the appearance it ought to have: it is either darker or lighter than is natural, has an offensive odour, and, when broken, crumbles to pieces, and appears to consist of lumps of loosely compacted chopped hay, mingled with many entire or imperfectly dissolved oats. In the stable, the horse is inclined to be costive; but, when taken to work or exercise, may be soon excited to purge.

The SKIN will be certain to sympathise with this disordered condition of the alimentary organs. The coat will evince this. And, besides, some eruptive or morbid action may be set up which we shall not get rid of until we have corrected the digestion. Covered as every part of the skin of the animal is with hair, we have no very accurate accounts in what these eruptive or morbid actions, arising from indigestion, consist; although the trite proceeding in practice of dispersing them by means of a dose of physic, is as old as any part of our therapeutics. This is a subject on which we lack information.

The SEAT OF INDIGESTION would appear, commonly, to be the villous lining of the stomach and intestinal canal: both these membranes furnish secretions indispensably necessary for the due conversion of the food into alimentary and fæculent matters, and one or both of them may be functionally faulty. Independently, however, of any derangement in these membranes, many and various other causes might be mentioned, sufficient of themselves to account for the incomplete performance of the digestive process. Mastication may not have been duly performed: the salivary secretion may be bad or defective: the liver may not have done its duty—the bile may be defective in quality or quantity, or the pancreatic juice may; or there may exist some derangement in the peristaltic action, and consequent irregularity or defect in the stay or progress of the alimentary matters. In fine, I repeat, other causes may exist, notwithstanding irritation, or inflammation, or disorder in some form or other of the membranous lining of the stomach and bowels, appears to

be the ordinary one, and therefore is that to which my observations in this place are intended to be chiefly confined.¹

The ORDINARY SUBJECTS OF INDIGESTION are three, four, five year old horses, and especially such as have been reared in low, marshy, cold, poor pastures: the coarse, rank, sour kind of herbage they eat seems to lay the foundation for disorder in their bowels, a tendency thereto being probably created by constant exposure to every severity of weather. The first impression seems to be made upon the skin, the bowels becoming subsequently affected, through sympathy. Commonly, by change of diet, and by being taken proper care of, with some aid from medicine, horses outgrow this innate unhealthiness; though we meet, now and then, with one to whom it would seem to cling for the remainder of life. But horses may experience indigestion while living in stables. Sometimes, among an establishment of horses, one turns out unthriving and looking ill-conditioned: without complaint of his not feeding, or even of not doing his work, the animal is, to appearance, out of health, and yet we are unable to detect any positive disease about him. We inquire, as far as we are able, into the state of his digestion, and we find reason to believe that his ill looks and unhealthiness may be attributable to the imperfect or disordered manner in which that function is carried on. His dung may show evidence of this. Perhaps, the hay he consumes appears impacted in the dung-balls, as though it had been simply chopped up and made up into balls; or the oats may appear whole or unmasticated in them; or the dung may not exhibit its natural colour, appearing lighter than ordinary, or clay-coloured, as though there was a deficiency of bilious secretion in it. Sometimes, in the worst cases of this description, the peristaltic action is irregular, causing the horse to purge at times, on those occasions when he is much heated or worked.

TREATMENT.—The ordinary mode of dealing with these cases is to administer two or three doses of physic, at intervals of a week or so. A preferable procedure to this, is

¹ For further information, peruse the observations on Gastro-Enteritis.

the old one of dividing the purge into two or three doses, and giving them at intervals of three or four days: the bowels being, in many of these cases, in such a state of morbid susceptibility that a full dose of purging mass is apt to bring on troublesome diarrhœa. Besides which, I have invariably found, that keeping up a very moderate discharge from the bowels is, in the end, productive of more benefit than giving full doses of physic. When diarrhœa or scouring is actually present without any medicine having been given, or in a case where ever so little aloes induces it, I have seen much good effected by administering *hydrarg. c. cretâ* in doses of a quarter ounce, once or twice a-day, made into a ball with powdered ginger and syrup. Cases in which, on the contrary, costiveness is a prominent symptom—there appearing to be a deficiency of bile—are benefited by the exhibition of a scruple of calomel once a day, either in combination with a drachm or a drachm and a half of purging mass, or else followed up by a dose of physic.

The Plummer's ball, composed as follows, is an excellent formula for such cases as these:

R Hydrarg. Chlorid., gr. x;
 Antimon. Oxy.-Sulphuret., ʒj;
 Guaiaci, ʒij;
 Farinæ Avenæ, ʒij;
 Syrup. Zingiberis, q. s. ut f. Bol.

To be given once or twice a day.

CHANGE OF DIET will often much assist in the restoration of normal digestive functions. When green-meat can be procured, soiling in the stable will be advisable; though in mild weather, particularly in the spring of the year, when flies are not troublesome, a run at grass is to be preferred: breathing the open air all day long, with the moderate exercise the animal takes of his own accord, being the change of diet very conducive to return to health. In the winter season, carrots are given with advantage: Swedish turnips are also recommendable: bruised or scalded oats may also be tried.

When simply the mastication is found faulty, mingling the oats with chaff sometimes proves remedial: should it not, the teeth ought to be inspected. Linseed and malt may be given in mashes, or the latter may be made into tea; or hay-tea may be offered; though the horse is not likely to drink either of them voluntarily, unless he have been previously kept short of water. Drink ought, in all cases, to be given *to the full* the animal will take: better still, if the pail be so placed that he can help himself at pleasure. All this, however, comes within the proper province of HORSE DIETETICS: a subject into which inquiries upon a large scale have proved of the greatest service, at the same time that they have been productive of interest and satisfaction to the experimentalist.

GASTRITIS.

GASTRITIS or inflammation of the stomach is a disease which in the horse but rarely comes under the veterinarian's notice. Not that it is so uncommon a disease; for every practitioner who has been in the habit of inspecting the stomachs of horses after death well knows that nothing is more common than to find the vascular gastric membrane reddened; and in cases wherein medicaments of an irritating nature have been administered, it is but natural, unless any very evident cause should exist for a contrary opinion, to refer this inflammatory appearance to the medicine. I am so far from denying the existence of even *idiopathic gastritis*, at least in a *chronic* form, that I think it not at all unlikely it may have much to do with indigestion, and, perhaps, with some other like cases about which we are at present equally in the dark.¹ Admitting, however, that it has a claim, in the spontaneous or self-originating form, to be numbered among horse diseases, we are in possession of no *sure* signs to lead to its detection; at least, I do not pretend to know of any. We appear to pronounce with certainty upon gastritis only in those cases in which its presence

¹ Bear this in mind in perusing the account of Gastro-Enteritis.

is manifestly attributable either to chemical poison or mechanical irritation; and even in these we are commonly led to the seat of the disease rather by circumstantial evidence than any pathognomonic we are able to glean out of the case itself.

By CHEMICAL POISON, I mean the irritation and consequent inflammation caused by substances (some vegetal, more mineral) given either in an improper form or undue quantity; many of which, sufficiently diluted or reduced, we are in the habit of administering medicinally; though even in their medicinal forms are they very apt to leave marks of irritation, often amounting to inflammation, upon the tender villous lining of the stomach. The aloes composing a common dose of physic does this; hence arises the nausea and loathing of food. Gastritis and death used to be by no means an uncommon consequence of "a dose of physic," when aloes was wont to be given in large and excessive doses: though now that the dose is reduced to a proper standard, the occurrence be rare, still, now and then, will it happen. Mr. Daws relates a case in vol. xiii of 'THE VETERINARIAN,' wherein a horse, well prepared, took but 5vij of aloes. The day after, he was seized with pain; his belly swelled; with countenance betraying intense anxiety, and his body was covered with cold, clammy sweat. The stomach was found, after death, in a state of distension of air, with but little food in it; and its villous lining proved a sheet of inflammation.

Hellebore, blue vitriol, corrosive sublimate, arsenic, verdigris, &c., take a similar but more potent effect. When any such substances as these are introduced into the stomach in excess, either as regards their quantity or strength, and in consequence produce a degree of topical inflammation sufficient to cause pain and arouse fever in the system, we denominate the substance a *poison*, and feel not more desirous to investigate the seat of the disorder than to make some discrimination in the symptoms characteristic of different poisons, in order that we may thereby be able to conjecture which kind or one of them has been exhibited.

The SYMPTOMS occasioned by the introduction to excess

of any of the metallic salts in common use, or the mineral acids or caustic alkalies, or, in fact, any poisonous agent, will vary with the dose and virulence of the poison but otherwise will not be much altered—so far as these three classes are concerned—by the kind of poison. The symptoms most remarkable from the presence of blue vitriol, corrosive sublimate, or arsenic, in the stomach, are—nausea and loathing of food, often accompanied by a discharge of saliva from the mouth. The horse paws; turns his head round, and throws a look of extreme distress at his flank; lies down; rolls about the stall; rises again in great agony and distress; heaves quickly and painfully at the flanks; and finally breaks out into a profuse perspiration. In cases of other poisonous substances, or of such as, from their quantity or indigestibility, act as irritants in the stomach, vomiting will be present, with eructation, and often extreme distension of the organ with gas, creating enormous tympany of the abdomen. The pulse at first is simply accelerated; after a time, it becomes contracted to a thread; at length, altogether imperceptible. Prostration of energy and strength now prevails; the animal reels about in attempting to walk. His bowels become either violently purged, or else he is troubled with painful tenesmus, and voids nothing but mucus. At last, from continual torment, the poor sufferer turns delirious, throwing himself about in such a terrific and heedless manner, in his stall or box, that no one durst approach him, and in one of his truly horrific and perilous precipitations, casting forth a delirious ghastly look, he suddenly stretches out his limbs, groans, gapes, and dies.

Without any allusion to poison, Mr. Tombs says, that “the most characteristic symptom indicative of Gastritis, is incessant eructation, *the stench of the gas escaping being intolerable.*”

THE POST-MORTEM APPEARANCES, in cases of death from the mineral poisons before mentioned, are as follow:—The villous membrane of the stomach exhibits a patchy intense inflammation: red or purple or black spots—depending on the intensity—being apparent upon its surface; it is thick-

ened in substance, perhaps coated with flakes of coagulable lymph; it may be in places, ulcerated; it may be gangrenous; it is possible it may have holes through it. The cuticular portion of the stomach, though not capable of any vital action in itself, is chemically acted on at times by the causticity of the poison, and then exhibits black patchy eschars.

In regard to ulceration of the stomach, that excellent surgeon, Mr. Abernethy, used to observe, how curious it was, though all the coats were perforated, yet did not the contents escape. For, as the ulceration proceeded from within outwards, the peritoneal tunic became inflamed, and contracted adhesion either with the contiguous bowel or else with the walls of the abdominal cavity, by which adhesion the aperture in the stomach became closed.

The intestines likewise suffer from poisons. The small, and, in some cases, the large guts show marks of violent inflammation in various parts. When arsenic has been given, the cæcum and colon are not infrequently discovered to be black and rotten—to be, in fact, gangrenous in places. One of the best tests, however, of the presence of arsenic in the bowels is the extremely offensive *fætor* perceptible the moment the gas is let out: there is something so peculiar in this disgusting odour that, once perceived, it can hardly ever afterwards be forgotten.

TREATMENT.—“The great object when arsenic; or indeed poison of whatever kind, has been swallowed, is to dislodge the poison as quickly as possible; and of all emetics, the very best is sulphate of zinc, because it produces full and speedy vomiting. But there are poisonous substances, such as opium and its preparations, in which the nervous power of the stomach is so prostrated, that the sulphate of zinc will not be so available as other emetics. The stomach becomes paralysed, as it were, and will not act. The flour of mustard is the best emetic you can employ in such cases, in the proportion of one tea-spoonful to a tumbler of water, repeated until full vomiting. The zinc emetic, when used, also requires repetition.”

“Are there any antidotes for arsenic? Magnesia and

sulphur have been so considered, but cannot be relied on. Dr. Pereira, and others, recommend the hydrated sesqui-oxide of iron, which is easily made by mixing carbonate of soda with the tinct. of the hydrochloride of iron.”—*Dr. Seymour’s Clinique, in the Lancet for July 28, 1843.*

Were the horse, like a dog or a man, able to vomit, no sooner would any poison possessing emetic properties be swallowed than it would become ejected. Unfortunately for our patient this is a benefit he cannot receive. What then is to be done? Undoubtedly, in the present state of science, the immediate introduction of the stomach-tube into the stomach, through which, as quickly as possible, warm water might be injected and withdrawn until we have completely washed out the stomach. This follow up by throwing in some bland mucilaginous fluid—starch-water, water-gruel, arrow-root infusion, or any such composition that can be at the moment got ready—and then withdraw the tube. Afterwards, the horse ought to be drenched from time to time with copious draughts of water-gruel. Though, if the practitioner happen to know what poison it is the horse has taken, he may bethink himself of administering some antidote after he has effected all he can with the stomach-pump. We see that the late Dr. Pereira recommended the hydrated sesquioxide of iron. In the case of corrosive sublimate, Orfila recommends albumen or the whites of eggs: these may be given in the gruel. To neutralise blue vitriol give also albumen, or a solution of soap. Should gastritis and fever result, in addition to all that is to be done, locally, we ought to bleed largely; perhaps apply a blister or mustard plaster over the surface of the belly; and never omit to administer, frequently, copious clysters, with the intention of promoting a free discharge from the bowels. If I ventured to give any purge at all, I would administer a pint and a half of the common or second olive oil. Castor^d and linseed oils are both either inert or dangerous in their operation. Aloes, drastic and irritative as we know them to be, appear on that account to be hardly admissible.

On this subject Professor Morton remarks, in his Introductory Lecture for 1839-40: "It is true, the poisoning of animals is not of so frequent occurrence, nor its consequences so awful, as that of our fellow-creatures; nevertheless, from time to time it does occur, and we ought to be enabled *at once* to exhibit an antidote, since delay is too often fatal. In the horse, vomition cannot be excited; therefore you ought to be familiar with an agent that will at once arrest the effects of the poison; or, by decomposing it, will render it innocuous, and prevent those torturing pangs which always accompany death by poisoning. For instance, the fatal effects of corrosive sublimate may be counteracted by the exhibition of albumen or whites of eggs. The preparations of lead and copper by sugar; tartar emetic, by astringent vegetables; the antidote for arsenic is the true oxide of iron, which decomposes it, forming an insoluble arsenite of iron; or the solution of lime may be tried, accompanied with the free use of diluents and oleaginous purgatives, in order to expel the (poisonous) agent." In regard to arsenic, I may mention here an extraordinary instance, where two doses of the mineral were given, one of ʒj , the other of ʒiss , with ʒss of sublimate added, without destroying the horse, to which end they were administered.—'VETERINARIAN,' vol. xxii, p. 29.

MECHANICAL IRRITATION may produce gastritis, though there is not half the apprehension of its doing so that people in common are apt to imagine. For, whatever food the horse consumes of an asperous or prickly nature, is not only first well broken and ground by the teeth, but subsequently becomes triturated within the insensible cuticular pouch of the stomach, before it be suffered to come in contact with the sensitive part, and thus, in a measure, is rendered mechanically innocuous. However, it may and does happen on occasions that, either from imperfect mastication or trituration, irritating substances gain admission into the vascular compartment of the stomach, and there become likely to

¹ 'Veterinarian,' vol. xiv, p. 767. To him desirous of pursuing this subject, I recommend Morton's 'Toxicological Chart.'

excite an attack of gastritis. The following account is extracted from some cases transmitted to 'THE VETERINARIAN' for 1838, by N. B.:—

Mr. B. (Bean?) during the autumn of 1826, was called to six cases of gastritis, occasioned by the horses eating haws from the thorns in the hedge-rows. The symptoms were similar in them all. Pulse thready, and scarcely perceptible; extremities cold; skin covered with dewy perspiration; respiration remarkably quiet. At intervals, large quantities of fluid were ejected from the stomach, having a peculiar acid odour: medicine in the fluid form was similarly discharged. Bleeding and medicine proved of no avail: the animal died six or eight hours after Mr. B. had been called in. Patches of inflammation appeared upon the duodenum. The stomach and omentum had a purple appearance; and, when the former was laid open, a hard substance was found within, about the size of a goose-egg, composed of haws and fragments of thorns, possessing a rough surface. The villous membrane presented evidence of the intensest inflammation, and around the pylorus were various marks of laceration caused by the rough substance within. The years 1825-27 produced no such cases: a circumstance that has since led Mr. B. to connect their occurrence (in 1826) with the scarcity of after-grass which then existed: the horses being driven in consequence to browse on the hedges.

Mr. Tombs was called to a horse suffering from gastritis, caused by over and improper feeding. The stomach, after death, proved inflated to a great degree with gas, and was "exactly like a blown-up bladder," occupying a large portion of the epigastric region. It also contained half a gallon of split beans, but slightly masticated, and not at all digested. Its villous coat was intensely inflamed in patches."—'VETERINARIAN,' vol. xxv, p. 637.

BOTS.

Bots—in some parts of the country called *maw-worms*—are the little grub-like creatures voided by horses with the dung, sometimes in considerable numbers, more in certain situations than in others, during the autumnal season of the year, with the appearance of which all horse-people are perfectly familiar. These little animals are commonly regarded and spoken of as *worms*: this, however, is a vulgar error of which we cannot too soon divest ourselves, and no longer view them in any other than their true light—as the *larvæ* of the *æstrus* or gad-fly. For a very pleasing and instructive essay on the bot, from which I shall take the liberty to make some lengthy extracts, the profession are indebted to Mr. Bracy Clark: in so doing, however, let me strongly recommend the work itself to the perusal of every one desirous of investigating so interesting a subject.

MR. CLARK PARTICULARISES THREE SPECIES OF BOTS: they are such, however, as are rather distinguishable from one another by incidents connected with their natural history than by any specific corporal characters. The first is the *æstrus equi*, the large spotted horse-bot, the most interesting of the three to us in this country; the second is the *æstrus hemorrhoidalis*, or fundament bot; the third, which Mr. Clark has named the *æstrus veterinus*, is the red bot.

Of the *ÆSTRUS-EQUI*, Mr. Clark says, “As it is necessary to break into the circle of its history at some point, I shall begin with an account of the egg, and its deposition upon the skin of the legs of the horse, which is done in the following remarkable manner:—When the female has been impregnated, and the eggs sufficiently matured, she seeks among the horses a subject for her purpose, and, approaching him on the wing, she carries her body nearly upright in the air, and her tail, which is lengthened for the purpose, curved inwards and upwards: in this way she approaches the part where she designs to deposit the egg; and, suspending herself for a few seconds before it, suddenly darts upon it,

and leaves the egg adhering to the hair. She hardly appears to settle, but merely touches the hair with the egg held out on the projected point of the abdomen. The egg is made to adhere by means of a glutinous liquor secreted with it. She then leaves the horse at a small distance, and prepares a second egg; and, poising herself before the part, deposits it in the same way. The liquor dries, and the egg becomes firmly glued to the hair: this is repeated by these flies until four or five hundred eggs be sometimes placed on one horse." The parts chosen for the deposition of the eggs are those liable to be licked by the tongue: the inside of the knee is a favorite spot, and, next to this, the side and back part of the shoulder, and, less frequently, the extreme ends of the hairs of the mane. Now, the common notion is, that the *ova* are licked off the skin, and so carried into the stomach; but Mr. Clarke observes, "I do not find this to be the case, or at least only by accident; for, when they have remained on the hair four or five days, they become ripe, at which time the slightest application of warmth and moisture is sufficient to bring forth in an instant the latent *larva*. At this time, if the tongue of the horse touches the egg, its *operculum* is thrown open, and a small active worm is produced, which readily adheres to the moist surface of the tongue, and is from thence conveyed with the food to the stomach." And it appears, that the irritation of the common flies proves the instigation of the animal's licking himself; not, however, that this is absolutely necessary, for "a horse that has no *ova* deposited on him, may yet have bots, by performing the friendly office of licking another horse that has." The larva or worm, being hatched and lodged in the stomach, immediately clings, by means of its *tentacula*—two dark brown hooks, between which is its mouth—to the cuticular coat, which they pierce, though they never insinuate their points into the muscular or sensitive tunic beyond it: in this manner, so pertinaciously does the bot adhere that, in our attempts to unhitch it, it will frequently suffer its hooks to be broken, or even its body severed, rather than quit its hold. Now and then, but I

believe very rarely, they are found hooked into the villous coat; these, however, are nothing more than stragglers—bots, probably, that had, on their arrival in the stomach, been hastily carried with the aliment into its vascular part, before they had the power of fixing their hooks into the cuticular. Here, then, is a fact which ought to stifle our apprehensions about the pain and irritation that these animals are said to occasion: how they can cause either when they are fastened to an insensible part—to a part as devoid of feeling in itself as the very hoofs are—I have yet to learn. On one occasion, I found more bots within the vascular than cuticular portion of the stomach, and a still greater number within the duodenum; and this happened in the month of January. I have repeatedly found them in the duodenum. However, I regard these as mere casual facts: their ordinary and natural nidus appearing to be the cuticular pouch of the stomach. Farther on, a case will be given in which they had made their way into the œsophagus. The bot thus transported—about the latter part of the summer, while horses are at grass—remains in the stomach through the winter, until the end of the ensuing spring, when, being at the consummation of this stage or form of existence, it spontaneously disengages itself, and passes with the chymous matters into the intestinal canal; where its stay probably is but short, since it now lies loose among the alimentary matters, and is eventually cast out from its animal abode with the dung.

Now, it has long been a question, and one which is not yet set at rest, on what these worms subsist in the stomach. Mr. Clark supposes their food to be the chyme, which, (he says) being *nearly pure aliment*, affords probably but little excrementitious residue. I do not, however, believe that “nearly pure aliment”—what we understand by *chyle*—is found in the stomach, much less in the cuticular part of it, where, as far as I have observed, the food itself remains unchanged even into chyme. But, suppose they were surrounded by chymous, or even chylous matter, their mouths, instead of floating in it, are opposed to, if not in

contact with, the lining membrane of the stomach, and, consequently, not conveniently placed for such imbibition : in fact, their mouths must be, I should imagine, enveloped and concealed by mucus, since abundance of that food is deposited upon the surface of the alimentary mass, to sheathe the stomach from mechanical irritation. And, for my own part, I feel inclined to think that this mucus constitutes their food ; and this is aliment, probably, which possesses little or no excrementitious matter, since it is itself re-absorbed in many parts of the body ; and what favours this opinion is, that there are bots within the sinuses of the head, in the skin, &c. of cattle, which can have no other sustenance save the secretions of those parts, a fact that Mr. Clark himself admits : also that worms in the intestines of animals are nourished in the same way, is rendered highly probable by the existence of the *ascaris* within the colon and rectum—cavities which contain little or nothing else but what is excrementitious.

About the month of June or July it is that bots, having quitted the stomach and been transported with the aliment through the windings of the intestinal tube, become discharged in the fæces ; also at this period it is that people discover, for the first time, that their horses (particularly those that have been at grass the preceding autumn) have what they call “ worms ;” to get rid of which vermifuges all at once come into pressing requisition. If, however, these well-meaning people will have but a little patience, their imaginary plagues will soon quit the bowels of their horses of their own accord : the time being now arrived for them to assume other forms, and so answer the remaining ends of their nature. The larva, being ejected, lies not long exposed upon the ground, or concealed in dung, but quickly dries up and sinks into the state of *chrysalis* or grub, in which torpid condition it continues for a few weeks. At the expiration of this time, “ the superfluous moisture being removed, and the parts of the future insect being hardened by drying, it bursts from its confinement, and the fly appears making its exit at the small end.”—“ On quitting their

shell" (male and female) says Mr. Clark, "they in a few hours become dry, take wing, and then seek their mates. The female being impregnated, searches for a proper subject among the horses, performs with great solicitude and care her office of depositing her eggs upon the legs of the horse, in the manner we have already stated, thus completing the wonderful round of its operations and history."

THE INSECT OF THE *ÆSTRUS HEMORRHOIDALIS* OR FUNDAMENT BOT, whose manner of depositing eggs, says Mr. Clark, has never been described, or known before, chooses the *lips* of the horse for this purpose, "which is very distressing to the animal from the titillation it occasions; for he immediately after rubs his mouth against the ground or his fore legs, or sometimes against a tree, with great emotion; till the animal at length, finding this mode of defence insufficient, enraged he quits the spot, and endeavours to avoid it by galloping away to a distant part of the field; and if the fly still continue to follow and tease him, his last resource is in the water, where the *æstrus* never is observed to pursue him. These flies appear sometimes to hide themselves in the grass, and as the horse stoops to graze they dart upon the mouth or lips, and are always observed to poise themselves during a few seconds in the air, while the egg is preparing on the extended point of the abdomen."—"The larva or grub of this species inhabits the stomach as the former, generally adhering to the white lining, and is disposed promiscuously in dense clusters after the same manner; they may, however, be distinguished from them *by being in general smaller, longer in proportion to their bulk, and rounder; and, I have thought, of a duller red, or more inclining to a white,* than those of the *æstrus equi*, for they differ in appearance in different subjects." These bots quit their habitation in the same season of the year, but are rendered remarkable by their "sticking more or less within the verge or opening of the anus, adhering to its soft lining, and producing considerable irritation. Indeed, I once well remember," continues Mr. Clark, "being on a tour of pleasure in the Isle of Wight, and experiencing much annoyance from

these larvæ The little horse I had hired for the occasion became so lazy and unwilling to go on, and moved so awkwardly, that I could not keep pace with my company, and I was at a loss how to proceed; when, on casually taking up the tail, I discovered three or four of these insects hanging to the rectum, and their removal instantly proved a cure." Its change to the *chrysalis* state, and further transformation into that of insect, which happens in about two months, is similar to what befalls the *æstrus equi*.

OF THE *ÆSTRUS VETERINUS*, OR RED BOT—so designated by Mr. Clark in preference to retaining the epithet *nasalis*, which conveys a false notion of its habitation—the same historical detail does not appear to be made out; for our author commences his account of it by saying, "The mode of this insect depositing its eggs or nits is at present unknown. By watching for them on the commons in the warm days of the sixth and seventh months (July and August) it might be detected, I apprehend, without very great difficulty. They, perhaps, deposit them about the lips or legs, as the former species. The larva of this species is also not certainly known. That it inhabits the stomach, as the two former species, there is little doubt; and I have taken considerable pains to search for it at the slaughter-houses, and have found a species in the stomach which widely differs from the *equi* and *hemorrhoidalis*, and which I presume may be the larva of this: though it is possible there may be a fourth species inhabiting the stomach of the horse, in which case it may be still doubtful, so that I do not positively assert it to be this larva belonging to the *veterinus*.

"This larva, if it is the *veterinus*, may be known from the two preceding species, *being smaller, of a more tapering or oblong figure, and the segments more detached and rounded, shining, smooth, and of a pellucid red or ruby colour, more particularly at the tail or obtuse end.*"

After having described a fourth species, or what he apprehends to be so, from some peculiar characters it possesses, Mr. Clark asserts that he once found the real *chrysalis* of the *veterinus* in the neighbourhood of Worcester,

under some horse dung—a drawing of which he gives from memory.

SUMMARY.—The ovum, nit, or egg of the bot, then, it appears, being deposited, some time in the autumn, upon the hair, becomes licked by the tongue, by the heat and moisture of which it is instantly hatched, and its larva liberated and absorbed. Along with the food, the larva is conveyed into the stomach, where it fixes its residence for the winter, insinuating its tentacula into the cuticular coat. In the spring of the year it withdraws its hooks, descends from the stomach into the intestines, and is carried along with the alimentary mass to be expelled with the fæces. Its exposure in the dung is quickly followed by its desiccation and contraction into the state of *chrysalis*, out of which, in about two months, it undergoes its last metamorphosis into the insect called a gad-fly.

PROFESSOR GUISEPPE LOSSONA, in contradiction of the foregoing account, is of opinion that all the alleged kinds of bots described by different authors, resolve themselves into a *single* species. His words are—"As to the number of species of those insects whose *larvæ* inhabit the stomach of monodactyles, contrary to the accounts of Bracy Clark, Meigden, Macquarr, and others, in my opinion, *there is but one*. Although there exist slight differences in the colour of the down of the face, in the hair upon the chest, and in the rings round the abdomen of the animal, such variations are but accidental, dependent on the locality in which they happen to be found: having myself proved that such insects as come out of *larvæ* that have been lodged in rotten oak trees are of a darker colour; while such as come out of the dust of the poplar tree, or out of sand, are lighter coloured, and clearer."¹

We now come to the

PROBABLE EFFECTS OF BOTS ON ANIMALS: a subject replete with interest, and one which presents a wide field for speculation, both to the physiologist and to the natural historian. By a train of reasoning, interspersed with some

¹ See the 'Veterinarian,' for March, 1854, vol. xxvii, p. 156.

(which appear to me to be) singular notions, Mr. Clark endeavours to show, that bots exert a salubrious influence in the stomach of the horse by promoting digestion, acting as what he calls *vellicatories*, the same as local stimulants and detractors, on the principle of counter-irritation. I cannot, however, acquiesce in these hypotheses, much less admit what this learned writer has adduced in support of them. That "children of cachetic habits breed worms faster than healthy children, which may tend to suppress or moderate the disease they incline to," is an opinion that obtained with our predecessors in physic, but one which I should apprehend would find few or no advocates among the physicians of the present age; and that sheep in low damp situations, *by being infested with worms may be preserved from worse disease*, seems to me to be equally irreconcilable with the sound pathology of the day. What Linnæus taught, "that lice, by gnawing or irritating the skin of the head, excite a sort of running sores among boys kept in filthy work-houses, or confined places, and become strumous or swollen by the confinement, *by this excitement are preserved from coughs, wheezings, blindness, epilepsy, &c.*" might have been perfectly consistent with the medicine of his day; but that Mr. Clark should repeat it to strengthen his opinions in this more enlightened age of medical science, I must say I feel some surprise. And when, in proceeding, I find it stated *that it will not be easy to discover how far the access of murrain in cattle; glanders, farcy, &c., in horses, may be prevented; and moon-blindness, inflammation of the lungs, spasms, splints, &c., in any degree checked or subdued by the presence of these local stimuli,—and, in another place, that his own horse became fatter in consequence of having had administered to him about three dozen of bots' eggs, and that the nasal farcy gleets of horses were cured BY STIMULATION TO THE STOMACH, from the exhibition of two powerful astringents, cantharides and sulphate of zinc*, I must add, that I depart, *toto cælo*, from the views here taken of the effects, healthful or hurtful, of these little animals; and I venture to be the more explicit in my opinions about these

remarks, as Mr. Clark says, he shall not be tenacious about the permanency of the foundation they may furnish materials for.

But let us inquire how the operations are to be conducted to which Mr. Clark attributes such a variety and number of beneficial effects—how bots *can* promote digestion, and excite irritation and issue by vellication. We must not forget, that bots are attached to a part of the stomach which does not perform any proper digestive function, and that all stimulants or other substances promotive of digestion must be applied to the *vascular* part, the only veritably digestive surface, or else, it is obvious, they can have no such effect. Moreover, in the *cuticular* portion of the stomach, which is *inorganic*, how can anything like a determination of blood or issue be produced. Indeed, I do not see with Mr. Clark how bots can perform the office of *stimuli* at all, unless it be that, by some motion they are capable of, they may have any such influence upon the mucous follicles—placed in abundance under the cuticular coat; but then, again, we are not sure that this secretion is necessary to digestion! Thus far, however, Mr. Clark and myself perfectly coincide in opinion—“that the perfect health they (horses) enjoy with them (bots) is proof sufficient of their innocuous nature and harmlessness in a general way.” Though I have heard Professor Coleman say, that he knew of one case where bots appeared to have destroyed life; since, after death, the coats of the stomach appeared eroded in places, as well as the diaphragm, and some of these animals had made their way into the cavity of the chest.

Hurtrel d'Arboval asserts, that, so long as bots exist but in small number, they do no harm and cause no pain; but that in a multitude, they occasion sharp pains, and prove detrimental to digestion by absorbing the greater part of the juices necessary for that operation. The following case proves that in numbers they are capable of doing a vast deal of mischief:

Mr. Cartwright attended a mare who, from being removed in the autumn to pasture upon wet marshy land, and suffered

to remain out until nearly Christmas, lost her flesh and strength. At length she became worn down to a skeleton, and, from debility, lost the use of her hind parts; in which condition she was destroyed. The colon and cæcum contained liquid fæces, consisting principally of the soil and grit she had eaten. The lining membrane was in a state of approaching mortification. In the ileum were many flukes, resembling those found in rotten sheep. In the stomach were forty red bots, which had in places almost eaten through its coats. In the œsophagus were two hundred large white bots, which in several places had eaten through and buried themselves under the cuticular coat: the tunic itself was altogether changed in colour and texture, and stank very much. There were about twenty pounds of soil in her intestines, which had evidently been picked up from the same soil spread on the field.

MR. CLARK CONCLUDES HIS INTERESTING ACCOUNT of the bots of horses with some observations on the most effectual mode of destroying them. He observes—and let this observation be imprinted upon our mind—that, “At the natural annual period of their transformation, they come away readily enough of themselves; and if it happen at the time that any medicine is being exhibited, it is considered as proof enough of its efficacy, and mistaken for the consequence of it: so easy is it to draw wrong conclusions. Neither opium nor tobacco given for several days have any effect upon them, as I have witnessed by opening the stomach after the death of such, and finding them lively and well. We can, it is true, force the poison down the horse’s throat, but we cannot afterwards get it into the throat of the worm, who is placed in his own element, and can refuse the food that does not suit him. Truly, is it therefore difficult to destroy them by means of poison thrown into the stomach.”—“The wisest measure,” continues our author, “for securing animals from their effects, is, to prevent their propagation or access; and their habits expose to us an effectual mode of doing this. The eggs of the *œstrus equi*, which are very conspicuous on the knee, the mane, and the sides of the horse, may be washed

off with a brush and warm water, or still more effectually removed by a pair of scissors. The same may be done for the hemorrhoidalis from the lips and beard.

“The other species being smaller, more rare, and probably less troublesome, require less our consideration.

“In respect to the hemorrhoidalis also, where horses have been much out to grass the preceding year, they should occasionally, in the warm months of the next summer, be examined for them; when they will be found, as we have already stated, hanging to the extremity of the rectum, and should be removed by the fingers. The destruction of a single one at this season of the year is not only the death of an individual and its effects, but the almost certain destruction of a numerous progeny; it is also useful in preventing the irritation which the spines of the bot occasioned to the anus, which irritation becomes very distressing to the animal if he is used on the road, occasions him to move awkwardly, wriggle himself about, and to be sluggish, and though beaten severely he soon relapses again into his awkward manner of going; which, as this happens generally in warm weather, is most commonly attributed to mere laziness.”

IT HAS BEEN CONJECTURED that bots might prove serviceable to the animal by aiding the cuticular coat in the trituration of the food. That Nature should have created an animal, and designed it as an inhabitant of the stomach of another animal, without some good, but, I suspect, as yet unknown end, I think, in unison with others, highly improbable—irreconcilable with her other beautiful and more readily-explained operations: I am, however, for my own part, I must confess, unable to lift up the curtain which is here interposed between fact and design.

SUPPOSING THAT BOTS DO GOOD rather than hurt, surely we cannot be solicitous about removing them; since, though we are unable to demonstrate their beneficial influence, we may, from all the circumstances we have arrived at a knowledge of concerning them, at least assert, *that they* IN GENERAL *are not injurious*. Howbeit, we cannot persuade the world

so; and therefore we must be prepared to meet the complaints of persons who come to us about June or July—and say that “their horses have *worms*, which must be got rid of”—with a remedy for that purpose. Should any other malady exist at the time, no matter what, its origin will commonly be traced to the presence of these *mischievous vermin*. In all works on farriery we find some recipe extolled as a vermifuge; which, unless it contain a purgative ingredient, we may, *sans* hesitation, expunge as inefficacious: for we know of no medicine that has the power of *destroying* bots in the stomach; and, if we did, are we sure that, even when dead, they would become detached from its cuticular coat: though, should they lie in its vascular part, they would be subjected to the action of the gastric juice? No medicine, therefore, not even a purge, can operate as an *æstrifuge*¹ but at a certain season of the year; when, as I said before, if we will but suspend its exhibition for a while, the bots will readily enough come away without our assistance. Supposing we are forced to prescribe something to expel them, we have no medicine so suitable as a common purge: a dose of aloes is all that is required, though it is usual to combine it with calomel, which may render it more expellent; wherein, I believe, resides all the (imagined) specific virtue of the latter medicine as a vermifuge.

GASTRIC CONCRETIONS.

This forms part of a subject which stood much in need of scientific veterinary investigation, in our own language, when, in the year 1844, Mr. Morton, of the Royal Veterinary College, read two papers on it, to the Veterinary Medical Association, which he afterwards collected into a distinct work, entitled, “On Calculous Concretions in the Horse, Sheep, and Dog;” from which I shall in this place make a few extracts. Mr. Morton arranges these con-

¹ I introduce this term to make a distinction between vermifuges and *bot* expellents.

cretions under three heads:—*Alimentary, urinary, and casual or occasional*. In the first class he places *stomachical* or *gastric* concretions, and *intestinal*; in the second, *renal* and *vesical*; in the third, *salivary, hepatic, &c.* In regard to gastric concretions, he observes—"Horses affected with bulimia will eat earth, stones, and various other matters; but such substances do not constitute true calculi, nor will they ever become converted into them. Millers' horses are said to be very liable to calculous concretions in the stomach, arising from their being fed on refuse bran or pollard; their nuclei consisting of pieces of granite or grit from the mill-stone, or of some adventitious substance which has been swallowed." Mr. Stanley, V.S., Leamington, sent Mr. Morton an account of a miller's horse he attended, with paroxysms of pain, who voided no fæces for six days, though on the seventh he did; and all was thought "going on well:" when, next day, he died. Two large calculi were found in the stomach, one weighing 4lbs., the other 5lbs.; the latter being "wedged in between the pylorus and duodenum, causing inflammation and death."—"I believe the existence of *two* such calculi in the stomach to be *rare*."

"It is no uncommon circumstance for hard substances to be found within the stomachs of horses. I have seen several specimens. They were chiefly calcareous. The largest I ever saw was taken from a horse of my father's that died of old age, after having worked in a clay-mill for a number of years. I think this was nearly as large as an ostrich's egg, and not very dissimilar in appearance; it was of an argillaceous nature, and was, doubtless, formed of the fine dust of the clay which the horse was continually imbibing with his food. Its nucleus was the large end (about half) of an old nail. I believe they are always found to contain a nucleus."

Thus much, on the subject before us, writes a correspondent, who signs himself J.F., of *The Hippiatrist* for 1830.

In *The Veterinarian* for 1837 is to be found the case of an Andalusian horse, reported by M. Blavette, V.S., who was, in addition to being a notorious crib-biter, a *depraved feeder*. "Neither manger nor rack, nor the fragments of

the bars, escaped him : he gnawed his halter, and licked the walls, and ate up all the earth he could get at; and was a confirmed roarer." For many years he had been subject to violent colics, which became latterly more and more frequent. In one of these paroxysms, at last, he died. There was found in his stomach, after death, four pounds and a half of earth and sand. He had, as was learned afterwards, escaped from his groom on the morning of the day he died, and galloped to the riding-school, where he was found eating the earth and sand composing the floor. A brass wire, about the size of a knitting needle, and eight or nine inches long, was found sticking in the intestines, through whose walls it had penetrated and had run into the lumbar muscles.

IN THE SAME JOURNAL FOR 1849, is related a case of *gastric calculus*, by Mr. Bulman, V.S., North Shields, of very extraordinary character. The horse was the property of N. Morris, Esq., of Blue House, Usworth. The animal had experienced some attacks of what appeared to be *colic*, and relapse had occurred after long intervals of perfect quietude and apparent health of a week and upwards; although, at the same time, the symptoms were not altogether precisely those of ordinary "gripes." Mr. Bulman found her in her first attack after his summons, "sitting upon her right haunch, turning up her upper lip, neighing, and looking around her in a wild and indescribable manner, and occasionally turning her nose close into the region of the heart. He raised her up, when she shook herself, and seemed quite free from pain." Mr. Bulman gave her purgative medicine. Three weeks after this attack, having experienced one relapse in the interval, Mr. Bulman was summoned with the message that the mare was "ten times worse than ever." He at once told the man "that there must be something seriously obstructing the passage of the food from the stomach into the intestines, and that *if flatus was commenced she would be dead before they could arrive.*" This prediction proved true. "The escape of air from the stomach was tremendous. The stomach was torn in all directions; the whole of its contents floating within the

abdominal cavity." And, "half-protruding through an aperture in the stomach, was a huge calculus, or bezoar stone, of the enormous weight of 12lbs. 1oz. avoirdupois."

Mr. Morton observes, that "the composition of these concretions enables us to trace them to their source. In the cereal plants, certain of the phosphates are met with, and in somewhat considerable quantities. It is, then, to the food that we are to look for their origin, coupled with the morbid state of the digestive functions, by which it does not undergo the necessary change; probably, from the succus gastricus not being sufficiently powerful to dissolve these phosphates, in which state they must be before they can be assimilated. A foreign body being now taken into the stomach, which may be a nail, a piece of wire, or a pin, or a portion of granite, quartz, glass, or any other substance, it serves as a common centre, around which the phosphates arrange themselves in their turn, and by the exertion of the force of attraction; and in so doing they blunt that which, by its sharpness, would wound the lining membrane of the alimentary canal, or by its asperities, excite in it a high degree of inflammation." "By my analysis of the stomachical (or gastric) concretion, the phosphates will be seen to be those of magnesia and ammonia;" and Liebig states that "phosphate of magnesia, in combination with ammonia, is an invariable constituent of all the grasses." "If, from its magnitude, the calculus is unable to pass through the pylorus of the stomach, then that organ becomes its residence, where, by gradual accumulation, it acquires bulk."

Cases such as these are not only undiscoverable, but hopeless. The history and habits of the animal may lead to conjecture; the symptoms may lead to suspicion; but, after all, we remain in uncertainty and practical impotence.

GASTRIC POLYPUS.

Mr. Brown, V.S., Melton Mowbray, has a preparation of a polypus which was taken out of a horse's stomach.

The subject of it—an old brown horse, Sheffield—was

found, early in the morning of the 1st of May, "labouring under an attack of the bowels." The animal experienced great pain, cold sweats, quick pulse, &c. No veterinarian attended. Oily purges and frequent clysters were exhibited without giving relief. The horse died on the fifth day from the first attack. About fifteen inches in extent of "the first small gut were mortified."—"The stomach was full, but its contents were liquid, and at the lower extremity there was a pendulous substance, which was plugged into the gut, totally obstructing the passage. I am informed that the animal was a remarkably healthy one, and apparently suffered no inconvenience from the polypus, until it had formed a mechanical obstruction to the pylorus. The pedicle is rather tortuous, with an artery and two veins in the centre, having an expanded origin, which becomes converged into a firm cord, one inch in diameter and three long, terminating obliquely in the body of the polypus, which is a firm flat substance, weighing seven ounces and a quarter."

SECTION XI.

DISEASES OF THE INTESTINES.

GASTRO-ENTERITIS.

SPASMODIC COLIC.

TYMPANITIC COLIC.

ENTERITIS.

VOLVULUS.

INTUS-SUSCEPTION.

CONSTIPATION.

INTESTINAL CONCRETIONS.

————— WORMS.

DIARRHŒA.

DYSENTERY.

HERNIA.

————— INGUINAL.

————— SCROTAL.

————— UMBILICAL.

————— VENTRAL.

————— DIAPHRAGMATIC.

PROLAPSUS ANI.

HÆMORRHOIDS.

THE intestines of the horse are more obnoxious to disease than his stomach: they are greatly more voluminous; the part they have to perform in the process of digestion is more complex; the aliment remains for a much longer time within their cavities, so that any thing hurtful it may contain has more opportunity of developing its deleterious effects; added to which, from the extreme length, tortuosities, and irregularities in shape and volume of their canal, concretions are more likely to form within them and obstruct their passages. Moreover, the intestines, in the performance of their functions, have entailed upon them a motion from place to place—one of a vermicular description—in the course of which it occasionally happens that one of them gets twisted or tied in some indissoluble kind of knot, wherefrom obstruction and consequent loss of life are likely to ensue. Several of the intestinal diseases are of a nature highly acute, rapidly destructive, and require correspondent activity of treatment; others there are so insidious in their course, that, unless special attention be drawn to them, they will exist and depart without our knowledge; or, they will run into a stage in which they become out of the control of medicine before our attention be attracted to them. In making these observations, I feel I am approaching the con-

sideration of a disease which in our own country has had too little notice taken of it; while our professional brethren across the Channel have ascribed an importance to it proportionate with the reputation of the physician who first obtained a place for it in human medicine,—the celebrated Broussais. Without going the length of this medical philosopher, who asserted that *four fifths* of diseases consist in irritation of the intestinal mucous membrane, and that therein resides *the essence of fever*, we may, for some considerable way, accompany our fellows, the French veterinarians, and with them admit that it is a disease which has been much overlooked. To Girard, Dupuy, Bernard, and Leblanc, are veterinarians indebted for excellent accounts of it; and as these authors have been freely drafted from by D'Arboval, I shall take the liberty of transcribing from the work of the latter, in order that my reader may have the very best observations on the subject laid before him for his future consideration and guidance.

GASTRO-ENTERITIS.

In animals affected with this disorder, the local phenomena of inflammation are unappreciable during life, in consequence of their inability to express any sense of the inward pain or heat they may and do assuredly feel. We can only suspect their existence by making pressure upon divers parts of the abdomen with more or less comparative force, and thus guess at the principal seat and extent of the inflammation. When the disorder sets in rapidly, it is indicated by dejection, dulness, slight anxiety; head dependent and heavy, and hanging in the manger; infiltration of the eyelids, which are half closed; reddening with yellowness of the conjunctiva; tearful eyes; deep and jerking respiration. Soon the mucous membranes acquire the same hue as the conjunctiva, and are at times infiltrated and tumefied. To these symptoms, are joined—loss of appetite, often sudden; a dry, clammy, foul tongue, red at its upper part and around the borders; more or less thirst; stiffness of the spine and hind legs, with difficulty in moving, and swelling of the latter, and staggering in the gait; weariness; alternate heats and chills about the ears. Pulse at the commencement full and strong, and quick; afterwards small, hard, and thready. The belly becomes tense, but has rather a tucked-up than an inflated appearance. On some occasions the attack is so

sudden that the horse, saddled or harnessed to go out, experiences all at once a remarkable heaving of the flanks, dilatation of the nostrils, dependence or incurvation of the head, griping pains, partial tremors of the muscles of the shoulder and stifle, staggering, sometimes squatting upon the haunches or falling down, and reposing the head upon the ground. Most horses cannot lie down; many maintain the erect position evidently with pain: others fear to move lest they fall. The vital powers seem to concentrate themselves inwardly; the skin becomes insensible; the coat loses its gloss, and turns dry and pen-feathered; prostration supervenes; the discharges are rare and scanty; the dungballs small, dry, blackish, and coated; the urine, equally scanty, is at one time reddened, at another limpid and crude, and not expelled without effort. Most horses, during the height of their complaint, will at intervals grind their teeth; all experience considerable heat under the foretop, across the whole parietal region.

The horses most predisposed to sudden attacks of gastro-enteritis are, the young, vigorous, sanguineous, and irritable; in particular those over-well fed in proportion to their work.

Duration.—When rapid in its progress but simple in its form, presenting no other than symptoms of gastro-intestinal irritation and disordered digestion, with little or no sympathetic re-action, it takes five or six days to acquire its height. Debility then more undisguisedly shows itself; the tongue becomes greatly more loaded and fuliginous; the hind legs swell more, and the fore ones begin to fill; the hair comes out with the least traction: at certain times of the day some experience dysentery; in all there is an exacerbation towards evening.

The termination is by resolution, or by passing into the chronic form, or, after a sharp conflict, by death.

In another form, the symptoms, less intense, develop themselves, and succeed one another more tardily; indeed, in most cases, they are ushered in after the same manner as all the phlegmasiæ. Some days before the attack, the horse grows slack in going, insensibly loses his accustomed gaiety, has no longer the same appetite, feeds tardily, sweats easily, stales often; passes hard, black, shining dung. After this, his appetite grows worse; he seeks to refresh his mouth by licking anything cold within his reach; he likes to plunge his nose into water, and as yet drinks freely; at length he refuses his corn and part of his hay, and prefers cold water; and begins not to lie down. In the beginning, the diagnosis is uncertain: it is only well characterised when the other symptoms have shown themselves and confirmed the attack. The symptoms are better marked in the evening and during the night than in the morning or in the day: at these times, besides such as are seen in a rapid attack, we have rejection of all food; either a pressing thirst or else a refusal of drink; phlogosis;

reddening of the conjunctive and pituitary membranes, whose vessels are injected. The pulse, at first full and hard, becomes feeble and accelerated. These symptoms often endure two or three days without any great accession: afterwards they daily appear more marked, and, when once they have acquired their greatest intensity, the dejection and heaviness becomes extreme; the heaving of the flanks hurried; gaping and grinding of teeth frequent; coat dull and on end; mane and tail easily plucked out. After a time the mucous membranes change their red for a livid tint, and emaciation ensues.

Complications.—With these phenomena become united, in both forms of the disease and in every case, more or less disorder of the functions of other organs. Divers phlegmonous complications make their appearance in other parts of the digestive apparatus and its dependencies—in the mucous membrane of the air-passages, in the brain, in the urinary passages, in the organs of generation, and even at times in the skin. The sur-excitation of the mucous membrane of the mouth may be regarded as sympathetic, for it increases or diminishes in the same ratio as the gastro-enteritic disorder itself does. According as the attack is sudden or protracted, this membrane is dry or clammy: the tongue rarely preserves its natural complexion and humidity; it has a more or less bright red aspect, particularly towards its point and border; its papillæ and mucous follicles are more or less developed; its surface blanched, white, or yellowish, is covered with a blackish epidermoid crust; the organ acquires volume and firmness, and exhibits sometimes along its under surface *phlyctenæ*, or else ulcerations more or less deep and extensive. In opening horses that have died, points of inflammation have been detected upon the pharynx and œsophagus; sometimes even aphthæ are found at the bottom of the mouth: I have seen them in many horses. The large intestines are sometimes inflamed, and even on some occasions the margin of the anus may be observed to have grown red. The liver, with its peritoneal covering and excretory ducts, participate in this sur-excitation. Gastro-enteritis rarely exists in intensity for any time without re-acting upon the mucous membrane of the respiratory passages, producing that sympathetic phlegmasia which is known by a sort of râle, by a painful state of throat and upper part of the windpipe, by embarrassed respiration, by dilatation of the nostrils, by accelerated heavings of the flanks, by a short, dry, hollow cough, by shakings, and occasionally by a discharge from the nose of frothy mucous matter, sometimes, but rarely, yellowish. Inflammation of the lungs may also be a complication: then the expiration becomes more frequent, the respiration short and quick, the expired air hot, and the pulse strong. Peritonitis and nephritis may likewise prove complications. In the first case, the horse experiences abdominal pains and rubs his lips; in the second, there is inflexibility of the spine about

the lumbar region, and the animal evinces pain when pressed over the kidneys: the urine is also redder and less in quantity. In fine, when gastro-enteritis is most intense, the consequent uneasiness and fatigue are often attributable to the brain; the derangement of which is indicated by the extended neck, the heat and heaviness about the head, the drooping attitude, the resting point that he makes of the manger, and the drowsiness he evinces. At the same time, the sight and hearing become affected; the conjunctiva looks red and injected, or it assumes a purplish hue, which at the bottom often turns yellowish, and exhibits *phlyctenæ*; the eyeball is inflamed, and the eye obscured; the muscles of the face are irregularly contracted; there is grinding of the teeth, often symptoms of vertigo, and sometimes to that degree that some veterinarians—among others, Dupuy—have regarded the gastro-enteritis of 1825 as a form of vertiginous affection. This combination is especially fatal, and quickly so, and particularly in old horses and such as are oppressed with work beyond their powers, or otherwise debilitated. Phlegmasiæ sympathetically developed in the urinary passages and organs of generation, will account for the changes in the urine before mentioned, for the agitation of the tail, the frequent desire to stale, the erections of the penis of the stone-horse, the outstretching of the legs of the gelding, the reddening of the mucous membrane of the vulva of females, and the sense of heat in introducing the hand into the vagina. The skin will not prove exempt from becoming sur-excited, as will be evinced by its elevation of temperature, its state of dryness or sweat, the slight adherence of the hair, its dull and rough aspect; and, moreover, in some epidemics, by the buttony eruptions manifest upon it. At the last, swellings rise upon the hind legs or hocks; œdema appears upon the belly, sheath, and breast; the scrotum becomes covered with a dried matter in place of the natural unctuous secretion; or else phlegmonous tumours form upon divers parts of the body: some we have observed upon the parotids and breast.

Autopsies.—Post-mortem inspections have shown different and various diseases, according as gastro-enteritis has set in more or less suddenly, been slow or rapid in its course, and more or less complicated with the inflammation of some viscus or other part, besides the stomach and intestine; for it is to be remarked, that constantly one organ is especially attacked, and exhibits disease violent in proportion as other organs are slightly affected. The mucous membrane lining the stomach is more or less reddened, particularly the portion within the right sac, the entire surface of which sometimes appears so. Besides which it is injected, and in some places ecchymosed. The red colour, proof incontestible of the existence of inflammation during life, appears under a great variety of shades. The deep brown tint shows gangrene, a change also indicated by the friability of the part and its speedy progress to putrefaction after

death. Patches of redness are also visible in different places upon the membrane (the mucous follicles being larger than common); sometimes superficial ulcerations, petechiæ even, and *gangrenous* eschars, which may be nothing more than ecchymoses. Similar appearances are found in the small intestines, whose mucous membrane in many parts is reddened, injected, softened, and studded with assemblages of pointed eruptions: a grey, thick, glairy mucus and some petechial spots are also visible. In some cases, the matters contained in the small intestines are solid, and look as though they had been dried; though this is an appearance more common in the large guts, unless there happened to have existed diarrhœa before death: in the cæcum we almost always find this, and for some way also, though in a less marked degree, within the cells of the colon. More or less inflammation is observable in the mucous membrane of the fauces; the sides of the tongue are covered with ulcerations resembling aphthæ; and the surface of the pharynx, which is more or less deeply reddened, sometimes presents a cribriform or worm-eaten appearance. Its follicles also often acquire such considerable development that they might be mistaken for buds with their orifices wide open. Some of these alterations are perceptible at times within the œsophagus. When the disease has proved complicated, we also find after death alterations in those organs which have shown a disposition to partake of it. The liver is often tumid, its veins are gorged with blood, and its substance is pale and without firmness: in some subjects ecchymoses and recent adhesions are apparent upon its exterior, evidently the consequences of inflammation. The lungs at one time are simply engorged; at another, within the anterior appendices and extremities of the lobes, they exhibit the red induration; or they are hepatised in places, or inflamed around their periphery, and contain spumous blood. In certain subjects, the pleuræ are reddened and thickened, and covered with layers of albumen, a part of which forms false membranes and points of adhesions to the walls of the thorax. Effusion is rare; notwithstanding, it has been observed by me in two instances, and in one of them so considerable was the quantity that the case nowise differed from hydrothorax. According to M. Girard, whose observations we are now borrowing, the heart is the organ most and oftenest affected. The pericardium, commonly infiltrated in substance with yellow fluid, contains more or less serosity, sometimes bloody, and affords evident marks of acute inflammation. In many subjects, the heart is twice its natural volume, its substance pale and discoloured, and, void of tenacity, rends with facility: its exterior, in a state of inflammation, exhibits black spots, the effects either of ecchymosis or gangrene (most probably of the former). Its cavities always contain black thick blood, semi-coagulated; and often yellow, consistent, fibrinous, albuminous concretions. These productions, large or small, exist sometimes, says

M. Girard, in the right cavities, sometimes in the left, and sometimes in both right and left at once: they always occupy the auriculo-ventricular opening, and more or less completely fill it. Such appearances would have escaped observation both in men and animals, had not M. Girard pointed them out in horses in the gastro-enteritis, called the *epidemic of 1825*. Do they form during or after life? The former Director of the Alfort School entertained the first hypothesis, and thought that the concretions in question might prove the cause of death, by producing that suffocation which he had observed in horses who died suddenly, and in a manner asphyxiated. Supposing it were so, adds M. Girard, we should obtain an easy explanation to the obstruction of the lungs, the engorgement of the liver, the phlogosis of the air-tubes, and the presence of frothy mucus within them. According to the same authority, the internal surfaces of the cavities of the heart present vestiges of sur-acute inflammation; the redness is most remarkable in the tricuspid and mitral valves, and extends into the arterial and venous trunks; though it is not equally perceptible in all the cavities of the heart, or within the venous and arterial trunks. * * * * In general, little alteration is visible in the brain; though in some subjects the exterior presents marks of inflammation. M. Girard once observed inflammation in the right lobe; and M. Rainaud speaks of the injection of the veins of the brain, of effusion into the lateral ventricles, of slight yellowish infiltration, and of concretions of the same hue in the choroid plexus. When the urinary apparatus participates in the inflammation, the kidneys are redder than ordinary, and their tissue is extremely lacerable; the bladder exhibiting red spots, and the urine being saffron or brick-dust coloured. In some instances the whole of the sub-cutaneous, cellular, and muscular tissue is infiltrated, and its areolæ are filled with yellowish fluid: an appearance most remarkable in the breast, scrotum, and sheath, when such parts have proved œdematous during life.

Such were the principal signs of disease observed in the horses who fell victims to the gastro-enteritis of 1825. The principal and most constant lesion, however—that which constituted the disease, and from which all the others were derived—was inflammation of the mucous membrane of the stomach and intestines.

The Diagnostic, from the number and confusion of the symptoms present, is often difficult as regards the organ essentially diseased, though there is no mistaking an acute attack of gastro-enteritis.

The Prognosis must depend upon the number and intensity of the sympathetic phlegmasiæ present, their extent and probable termination, as well as upon the gastro-enteritic affection. In general, horses die from the fourth to the seventh day; the fifth day is commonly most critical; the ninth day that after which the patient is regarded as safe.

The disease rages most in low wet situations, upon the borders of rivers and in valleys. In cases of relapse, it is the fifteenth or twentieth day, or later, before convalescence commences; and sometimes so much debility is left that the horse when down cannot rise without help. And as *sequela*, on some occasions, we have swellings in different parts, or swelled legs, or lameness (*rheumatic* ?), first in one limb, afterwards in another. Time must cure all these anomalous affections: it is seldom we can do much for them by medicine.

Hygiental Treatment.—Under circumstances where there is reason to apprehend an attack of gastro-intestinal inflammation, we may hope to do much by way of prevention by attending to little affairs of management—change of diet—the substitution of good straw for hay—the withdrawal of corn altogether—sprinkling the provender with salt water—or should the season and weather permit, turning the horses to grass; not however doing this, as too frequently is done, without some gradatory preparation; nor suffering them to remain out in cold nights. To such as appear at all predisposed, it will be proper to give white water for drink, and, in lieu of their oats, a mixture of bran and barley-meal soaked in water slightly nitred or acidulated, and to administer occasional clysters of warm water, without keeping them from work, though that may be diminished. Good grooming is absolutely necessary; and care ought to be taken not to walk the horses into water on return from work. Should the animal be young and vigorous, a small bloodletting may prove advantageous, and especially in a case in which some other disease already exists.

Curative Treatment.—In determining the treatment of gastro-enteritis, either on the eve of its attack or after it has commenced, regard must be paid to the nature of the causes which have produced it or may be continuing it, to the degree and extent of the inflammation constituting it, to the number and intensity of the diseases with which it is complicated. Among the therapeutic combatants for it, the most useful are bloodlettings, diluents, emollients, mucilaginous applications, with a proper regimen. The regimen must be severe, consisting of chilled water, very slightly nitred, whitened with barley-water, and mixed with linseed mucilage, providing the patient likes it; and it may be sweetened with honey or treacle. This is all the aliment to be allowed, unless indeed the disease be but slight, in which case a little green-meat may be given, or chopped roots, such as turnips, carrots, or beet roots; but it is better to abstain even from them. We must never forget that the digestive organs are not in a condition to digest, however light the aliment. Should the animal refuse the drink offered him in his pail, drenches of linseed tea, a pint and a half each, may be given four or five times a day. By way of stimulating the skin, the horse ought to be well wisped, or

brushed, or curry-combed; and clothed warmly, particularly when he feels cold and shivers; and should the weather prove fine, he may be walked out a little. In case the urinary and faecal excretions appear pent up, the hand, oiled, is to be introduced, *per anum*, and the rectum emptied, and afterwards a clyster given, composed of gruel, or linseed-tea, or mallow-decoction.

In the country, where in regard to bloodletting we are not wont to be scrupulous or apprehensive, four or five pretty copious bleedings at the beginning of an attack may be found requisite. We have frequently pursued this practice, and by it have appeared to prevent many of those sympathetic phlegmasiæ which accompany and aggravate the gastro-enteritic affection, and to have subdued an acute inflammation, particularly when this has been associated with an attack of the pulmonary or cerebral apparatus. We drew from the two jugulars of one of our own horses, attacked in 1825, eighteen quarts of blood in twelve hours; in fact, we continued the bleeding until the fulness and hardness of the pulse gave way, without which we are persuaded we should have lost the horse. It is only, however, in cases manifesting decisive inflammation that such large and repeated bloodlettings can be permitted; and in such as these we are not to be deterred either by the first signs of prostration or the fear of adynamy: we are to use little hesitation under such circumstances, though much caution is to guide our practice in this respect when the inflammatory symptoms are but slight. The state of the pulse, the condition of the patient, his age, strength, and form, and the degree and extent of the inflammation present, must regulate our proceedings. [To this let the author add, that bloodletting in large quantity or to great extent, is forbidden by more recent experience.]

Local Bloodletting.—As far as concerns the mucous membrane itself of the alimentary canal, it must be borne in mind that these general bleedings exert comparatively but little influence upon it: a large quantity of blood withdrawn from the jugular takes but little away from this membrane, and this large abstraction may occasion a debility which is not compensated for by the decrease of the gastro-enteritic inflammation. On this account, after a time, it becomes advisable to draw blood locally. As a substitute for leeches upon the epigastrium, which are applied with so much advantage in human medicine, we make punctures near together into both the subcutaneous thoracic veins, in a direction towards the diaphragm, and repeat these emissions at short intervals. Vapour baths directed upon the openings, or cupping-glasses placed upon them, may be employed to obtain more blood. The second case we had was bled but twice, and both times from the thoracic vein; and venesection could not have been carried further without harm. These local emissions are especially useful to stay an incipient gastro-enteritis. The nearer the

punctures are made to the epigastrium or umbilicus, the more efficacious. This is a bloodletting easy enough practised on the ox, on account of the large size of the subcutaneous *abdominal vein*; but in monodactyles this vein is less developed, on which account it is found more convenient or facile to open the *thoracic vein* at the place where it divides into two branches, from which spring the ramifications spread over the surface of the belly. It is always best, however, to open the abdominal vein; and, therefore, supposing on account of the fatness of the horse or other circumstances one cannot get blood enough from it, scarifications may be made, and upon them either cupping-glasses applied, or mustard poultices, made with vinegar. This quickly produces a tumefaction, by scarifying which lightly, and subsequently fomenting it, the coagulation of the blood is prevented, and thereby a sufficient emission obtained.

Medicine.—The mucilaginous drenches already prescribed will not be required should the patient drink the white water prepared for him; but then he must not be allowed to drink much at a time, and particularly when the abdominal heat is considerable. With this regimen we may with advantage give a mixture of liquorice root and mallows in some gummy solution. In the gastro-enteritis of 1825, benefit was found from the administration of drenches composed of linseed oil (olive or almond oil being too dear), honey or treacle, and vinegar, in equal parts. To horses with constipated bowels, or who staled but little, we gave at first, in their drink every morning, two ounces of cream of tartar, and added for other cases nitre to the water: vapour baths and emollient fomentations prove also of great service. When horses are of great value and have much care bestowed upon them, we have suspended under their bellies, so as to be quite near without touching the skin, bags containing bran and linseed meal poultices, and renewed them every two hours, keeping the animal the while well clothed. Unfortunately, this remedy, one of the best we possess, is not practicable upon a large scale: in the case of our own two horses, we attributed success to this and to bloodletting. We have never found anything necessary for the removal of constipation beyond emollient and oily clysters.

Complications.—Whatever may be the number and intensity of the sympathetic phlegmasiæ accompanying the gastro-enteritic inflammation, the basis of our curative treatment must be the same. We must do all we can to forestall these satellitic diseases; and if, in spite of us, some do manifest themselves, we must attack them in a manner and with means specifically appropriate to them.

Such is D'Arboval's exposition of gastro-enteritis, enriched with all his gleanings on the subject from the best French authorities; and such is an account of a disease which

appears hardly to have found a place in British veterinary medicine. Under my own observation, gastro-enteritis has proved anything but a disease evincing activity or immediate alarm of symptom. The horse evinces, soon after attack, extreme dulness and depression; manifests indifference, indeed aversion, to every kind of food, though he drinks; the coat loses its shining aspect and becomes lustreless and dead; there is general coldness of skin, with cold extremities; the mouth is moister than usual, having a soapy, slivery feel, and shows a kind of dull red, yellow aspect, as though the membrane was injected in part with bile; the tongue is brown and dry upon its dorsum, but grows red and moist along its borders and towards its tip; the same yellow-red condition is manifest in the conjunctival membranes, as in the buccal, and also in the Schneiderian as well; in some cases there is swelling of the legs present; the bowels may be constipated rather at first, but the smallest dose of aloëtic medicine sets the patient off purging; diarrhœa follows, in which the discharges are, though at first sparing, of the consistence and appearance of cows' dung, though very nearly or quite liquid, and of a peculiar dirty dark-brown colour, and, though not at the beginning, towards the latter stages, fetid in their character: indeed, at this time, the mouth also becomes fetid, and sometimes extremely so. The pulse will rise to 70 or 80. The respiration is not at first disturbed, though it may turn so before death, which is but too apt to be the termination.

POST-MORTEM.—We find the mucous lining of stomach very much inflamed, and of a Modena-red colour; the same lining of the small intestines slightly affected, but the colon generally intensely so, though in some cases the inflammation of the stomach is greatest. The liver is pale and clay-coloured. The thorax is free from any diseased appearance connected with the complaint.

The TREATMENT of such disease I have always considered to be best conducted on principles of caution, without running into any danger of doing harm by depletion, or, on

the other hand, overdoing the astringent and tonic plan. I have, for the most part, treated the symptoms of the disease, rather than dare to combat with its nature, when I felt myself unable to comprehend in what it consisted. The diarrhœa, when it has presented itself as a formidable symptom, I have opposed by doses of Pulv. Cretæ c. Opio, given in gruel— $\bar{3}$ j of the powder to a pint and a half of fluid. Further than this, the proportion of powdered opium (which in the compound powder is very small) may be, if necessary, augmented; or, when the diarrhœa appears mitigated, one may give, with prospective advantage, drachm doses of Hydrarg. c. Cretâ, in combination with half a drachm of Ipecacuanha in each dose, made up with bark and treacle. Liniment to the belly, or even blisters or mustard plasters, are always recommendable; and attention ought to be paid to diet, which should be good dry hay and corn, with good gruel or linseed tea allowed for drink.

How is all this? Is it really so rare a disease? Or, have we, when it has been present, called it—or rather miscalled it—by any other name? by fever, or influenza, or some other? From its mostly occurring in the *epidemic* form, it was natural enough for us to give the disease the name of *influenza*; but, if this prove the cause of leading us to commit such gross misapprehensions, the sooner we get rid of—or, if that be impossible, the less we use—such an unmeaning, or all-meaning term, the better. I believe, many of the cases presented to us about the spring and fall of the year will be found to possess the gastro-enteritic character; and this being once recognised, we shall, in acting in accordance with such a supposition, find ourselves pursuing at least some rational course of practice, and no longer, like grooms and farriers, be blundering on, right or wrong, in wild empiricism.

SPASMODIC COLIC.

The nosology of farriers furnishes no appellations so vaguely comprehensive in their meaning, or so likely to mislead, as those of *colic*, *gripes*, *cramp*, *fret*, &c. By such persons they are used, synonymously, to denote an assemblage of symptoms which experience has taught us are produced by some painful disease of the bowels, but of what nature or in what part, they leave us totally uninformed. We hear of *flatulent colic*, *stercoral colic*, *calculous colic*, *nervous or spasmodic colic*, *verminous colic*, *inflammatory colic*, and we are continually called to cases of "gripes," which turn out to be anything save what we who restrict the meaning of the phrase can regard as such. In fact, while farriers' colic leaves us to guess whether the disease consist in wind, in dung, in spasm, in calculi, in worms, or in inflammation; farriers' gripes merely signifies that the animal is labouring under some acute pains which are probably connected with bowel-disease, though now and then the case turns out to be a pleurisy! In order to guard against all this looseness of expression and the danger it may create, the best way will be, probably, to pay no attention to the appellations *colic* and *gripes*, save so far as they are used to denote what, in truth, is the veritable *gripe*, or *grip*, or *grasp*, viz., SPASM of the bowels, or, *spasmodic colic*.

SPASM consists in a contraction of some portion or portions of the intestinal tube. The tube, by virtue of its muscular coat, possesses a power of contracting its canal, which contractile property it is that enables it to press the alimentary matters onward from the stomach until they arrive at their ultimate destination—the *anus*. This muscular tunic, in common with other muscles, is liable to spasm or cramp; when which takes place, the intestinal canal is locally contracted to that degree that the aliment is, at the place or places of spasm, arrested in its course, and the pain, while the cramp or gripe continues, proves of the most exquisite and poignant character.

The SYMPTOMS of colic are similar, with two or three notable exceptions, to those denoting painful bowel-affections in general. The attack is sudden. The horse appears to be, all in a moment, seized with a sharp pain in his belly. He commences violently pawing and stamping, and striking his belly with his hind feet. Then, after a few times bending his knees and crouching his body, and advancing his hind feet underneath him in attempts to lie down, he at last *drops* rather than lies down, issuing a sort of grunt from the fall, and following that up by rolling upon his back, and endeavouring every time he turns up to balance himself in the supine position; though generally he is unable to accomplish this until his legs in rolling happen to come against the side of his stall or box. When once he has succeeded in getting upon his back, he will, with his feet drawn downward upon his belly, and his head and neck, perhaps, curved to one side, remain quiet for a minute or two together: this posture appearing to afford him temporary relief. On other occasions, after several ineffectual endeavours to roll upon his back, he will suddenly rise again, and, having given himself a shake, as it were to get rid of the straws or dust about him, stand so quiet for a time that he appears by his rolling and struggling to have rid himself of his pain. Soon again, however, he averts his head and anxiously looks back at his flank, with his ears down and an expression in his eye, seeming to say, "There lies my pain, and now I feel it returning again." Each successive fit or paroxysm turns out commonly to be longer and more violent than the one preceding. Early in the disease, the remissions from pain, or intervals of ease, are evident enough; but as the case proceeds, the paroxysms growing longer and the remissions shorter, after a time they become altogether unobservable. The unremitting pain the animal at this time is suffering, occasioning continual action and convulsion of body, sets him heaving at the flanks, and causes him to break out into a profuse perspiration: drops of sweat stand upon his brows and eyelashes, and every hair in his coat becomes wet through it. The next change, should his

torture continue unmitigated, is one bordering on delirium : he grows heedless of all around him; his eyes turn wild and frantic ; his violent precipitations render all approach to him perilous ; cold sweats bedew his body ; tremors succeed ; he falls or throws himself down, maddened and exhausted with pain, and in convulsions probably expires. The pulse at the onset of the disease, and during the remissions from pain, is but little altered ; but while the paroxysm endures it grows frequent, and becomes contracted to a thread ; indeed, at times is so indistinct as hardly to be felt at all. Under extremity of suffering, its quickness, and with that its strength and perceptibility, become augmented. The belly grows tense, sometimes perceptibly swollen, and commonly very tender to pressure. The bowels are constipated, though oftentimes dung will be passed on the eve of the attack and some time afterwards ; and this is a circumstance the tyro in practice must take care not to suffer himself to be deceived by. I have known a horse have *three* evacuations after being attacked, and, after all, die of unopened bowels. In the height of his pain the animal will not unfrequently void his urine.

DIAGNOSIS.—To this, as enabling us to distinguish spasmodic colic from enteritis, great importance, by the generality of practitioners, has been attached, on the score of the remedies prescribed for spasm being, of all others, the most improper ones for inflammation. I was once of this way of thinking myself ; but I find, as I grow older in experience, that my practice is becoming of a kind suitable to *both* cases, and consequently that such diagnosis with me is losing much of its interest. In the year 1824 I first made the experiment of combining my antispasmodic with a *cathartic*, and I became so satisfied with the result that I have, from that time to the present, continued the practice, and, I may add, with the happiest consequences. Still, it is proper that we should be made acquainted with the best diagnostics between colic and enteritis, and, according to my observation, they are as follow:—1st, colic is not ushered in by any antecedent indisposition, or any cold, or hot, or shivering

fit; on the contrary, its attack is both sudden and violent: 2dly, when the disease has set in, the expressions of pain are stronger, and come on by fits and starts: 3dly, the purely spasmodic affection is marked by remissions—intervals of freedom from pain and of quietude; and yet all the while may be observed that watchfulness about the patient which clearly shows him to be in momentary expectation of another paroxysm: 4thly, the state of the pulse is characteristic; while the paroxysm is on, it is (spasmodically?) contracted to a thread, perhaps is quite imperceptible, and yet not exceeding 50 in a minute. Professor Coleman was wont to attach much import to the circumstance of the horse rolling and *reclining upon his back*: for my own part, though I admit it to be in many cases a very prominent symptom, yet it is one I have seen present when no spasms have been noticeable. I once treated a case the subject of which lay on his back for upwards of a quarter of an hour at a time; and yet, when we came to open him—for he died—we found no spasms, but a *tympanitic stomach*, and an intense inflammation of the jejunum and ileum. Might not spasms, however, have existed during life? Some affirm there is manifest heat of abdomen to be felt in enteritis, and lay great stress upon the observable difference there is *in the manner* of lying down: while the enteritic patient lies down quietly and with a degree of caution, the colicky horse drops down on a sudden, and flings himself about immediately afterwards in violent commotions.

The CAUSE of colic, very often, is a draught of cold water, especially while the horse's body is heated. Water from certain mineral springs has been—apparently from its impregnations—noted for having this effect. Sudden chill of the skin is said to have produced gripes. A common dose of physic will now and then occasion it. I have witnessed the most violent spasms from both linseed and castor oils. Vetches and other green-meats will at times, especially when very early or very late in the green-meat season, gripe; and so will new straw, and particularly wheaten; and likewise peas I am informed: in fact, any irritating or acidulous

matters in the bowels may have this effect. Now and then, spasm is brought on by costiveness, and by stercoraceous and calculous concretions. Crib-biting gives rise to attacks like colic, from distension of the bowels with air; but this is a case which, like many others causing similar symptoms, requires a modification of treatment.

The SEAT of spasm, ordinarily, is the small intestines; in particular, the jejunum and ileum. I have seen the duodenum, however, contracted as well; in one case, a few inches from the stomach, its canal appeared to me perfectly impassable. I have also, in three or four instances, met with spasm in the large guts: in one, all three of them exhibited evident marks of spasm; the cæcum was exceedingly distorted by contraction, and, instead of being full of water, contained dung-balls; even the rectum had manifestly been spasmed. Usually, the intestinal tube is contracted to a third or fourth or more of its original volume, with interspaces of two, three, and four inches, and, in some cases, even a foot or more in extent: on one occasion I met with contractions, one measuring two feet, another a yard in length; the intermediate parts preserving their natural appearance. The parietes of the gut, in the contracted places, feel, from the condition they are in, thickened, when compared with other parts; added to which, they are in a remarkable degree whiter than the healthy portions. Sometimes it happens, in consequence of the confinement of alimentary or fluid matters between two of these contractions, that the intermediate portion of gut becomes distended to that degree that congestion—even in progress to gangrene, as I have seen—ensues. In one case of death from unrelievable spasms—found afterwards to exist in the jejunum and ileum—I discovered the carotid arteries to be—spasmodically(?)—contracted to half their natural caliber; though nothing of the kind was perceptible in the aorta. During life, in order to obtain blood—not being able to procure sufficient from the jugulars—I was compelled to open the submaxillary arteries, and from these vessels even, owing to the contracted state of the carotids, the streams were nothing

compared to what they would normally have been. In a case of extravasation of blood upon the cerebrum, I found the small intestines evincing in divers places contractions as great as though the horse had died of spasmodic colic; and yet he never had shown a single symptom of gripes: a circumstance that might be referred, perhaps, to the purges he had taken. Another instance, however, of the same appearances happened to me in a horse I had been treating for a fistula of the worst description, who had not taken any medicine for some days before death. These observations would lead one to believe that contractions in the intestines may exist without necessarily causing the animal pain.

DURATION.—Unless some decided check—if not a satisfactory arrest—be put to the progress of the disease within the first half-a-dozen hours, we may begin to harbour apprehensions about our success. Ordinary cases are relieved by a single dose of medicine; many without any medicine at all. Cases which run on unrelieved, to dissolution, seldom exceed twenty-four hours in duration.

In **STONE HORSES**, particularly in such as have raced or been in training, or have been kept as covering stallions, an attack of colic or enteritic symptoms is on all occasions to be viewed as, possibly or probably, *connected with hernia*. The scrotum should be examined without delay, and all inquiries made relative to the existence of rupture. Should the symptoms continue unrelieved, we must not rest satisfied with this even; but proceed to an examination of the inguinal canals and abdominal rings, in order that we may be sure that no knuckle of intestine lies incarcerated anywhere.¹ For the want of such thought and precaution several valuable horses' lives have been lost, some of whose cases stand recorded on paper, while others only exist in the mortified remembrances of those to whom they have unfortunately happened.

RELAPSE.—There are horses who, from some peculiar susceptibility of the intestinal tube, are particularly obnoxious

¹ For the method of exploring the inguinal canal and abdominal rings, turn to the article 'Inguinal Hernia.'

to this disease. In such subjects, a potation of cold water, in particular when the body is at all warm, is almost certain to induce spasm; green-meat also, and physic, will be likely to occasion it; and, therefore, all these things ought to be avoided: for these repeated attacks become not only exceedingly annoying, but, in the end, dangerous; so much so, that one would feel inclined to counsel an individual possessing such a horse to take the first opportunity of disposing of him.

I attended the same horse for one attack of gripes in March, 1826; for another in April; a third in June; and a fourth in August, all of the same year: of which last, after having experienced relief for some hours, each time, at three separate intervals, he died; as, indeed, I had predicted he would on the occasion of his surmounting, with much difficulty, the third attack. In addition to the ordinary contractions discovered in his small intestines, his stomach proved tympanitic.

The TREATMENT of an ordinary case of spasmodic colic is, in the notion of almost every one who pretends to the possession of any horse-knowledge, an affair of such simplicity and obviousness that it is seldom deemed requisite to call in professional assistance. Every farrier and groom, every horse-dealer and horse-keeper, fancies himself quite as competent to treat the case as the most skilful veterinarian; and, in point of fact, providing the disease be purely spasmodic, his remedy is likely to prove in the first instance quite as effectual as ours: it being notorious that almost all kinds of strong spirits and aromatics possess antispasmodic properties. The groom, being well convinced of their efficacy from experience upon his own person, as naturally runs for gin and pepper, or peppermint water, or some such not disagreeable compound, for his horse when "griped," as he does for some agreeable spirituous compound for himself; or he probably possesses some nostrum, which he declares and believes to be superior to every other, and, as an incontrovertible proof of it, asserts, that it "never fails" to cure. And, given at the instant, perhaps, it very seldom does; for it imports less *what* we give than *when* the remedy is ad-

ministered : that which is given at the *outset* appearing to have a decided advantage over anything exhibited late in the attack.

BRACY CLARK prescribes for colic a tincture of pimento, with the following directions for its composition and use :—

“Infuse ℥j of pimento in Oiss of water, and the same quantity of spirit, for several days ; strain the infusion, or let it stand until it be required for use. Give four ounces of it, mixed with common or peppermint water, immediately, and repeat the dose in half an hour, and every succeeding hour until the symptoms be relieved.”

Professor COLEMAN’S specific for colic used to be, oil of turpentine, given in doses of two ounces in a pint of tepid water, beer, or gruel, two or three hours, according to the demands of the case.

My FATHER’S favorite remedy was, one ounce of laudanum combined with two ounces of oil of turpentine, in a pint of some tepid bland fluid.

OTHER PRACTITIONERS are very fond of the æthers. For my own part, I must say I think a combination of sulphuric æther and laudanum, in from two to three ounces each, in a pint of warm water, forms a potent and effectual antispasmodic drench ; at the same time I am quite ready to repeat what I said before, that it matters less “*what* we give than *when* we give it.” And, furthermore, I can affirm, I have in numerous instances seen all these various remedies succeed, and on some few occasions have been present when one and all of them have totally failed to afford relief. I consider that opium holds the first place among antispasmodics ; and I put more trust in it when given in substance ; though the objection to this is, the greater length of time required for such effect to manifest itself, and its consequent unfitness in such form for the urgent necessities of the case before us. A very effectual antispasmodic *ball*, combining the three properties, narcotic, stimulant, and terebinthinate, which I keep made up for the use of non-professionals, is composed of one drachm of opium, of two drachms of Cayenne pepper or half an ounce of ginger, and of a sufficiency of

Venice turpentine and meal to make a moderate sized ball ; which, however, requires at the time of its administration, to have been fresh made up, or, at all events, to be *soft* and readily soluble.

MY OWN PRACTICE has, since the year 1824, consisted in the combination, in all save trifling cases, with the antispasmodic, of a full dose of cathartic medicine ; under the impression that, by so doing, I did not certainly detract from the power of the former in relieving spasm ; while, should the case hold out long enough, I had employed a powerful auxiliary under whose operation all spasm, and flatulent and fecal obstruction, would be likely to succumb.

A case of pure ordinary colic may be relieved in a variety of common-practice ways, such as walking or trotting the horse about, administering to him a common clyster, or giving him any common stimulant, either alone or with some sedative and more potent antispasmodic. In this manner, or even when nothing whatever is done, ordinary or true "gripes" occasionally passes off spontaneously ; should the symptoms, however, not in this way die away of their own accord, or should relapse take place, it becomes both duty and policy to give the case every attention. The first step to be taken, is to give the horse this drench :

R Decoct. Aloes C., ℥iv ;¹
Tinct. Opii, ℥ij ;
Sp. Æther. Sulphuric., ℥iv ;
Aquæ Tepid., ℥viiij. M. ft. haust.

Let this drink be followed, if it have not been given before, by a clyster.

A sufficient interval ought to be allowed for this dose to afford relief—say a quarter or half an hour, in which time,

¹ The decoction is made as follows :—

R Aloes Barbad. Pulv., ℥iiss ;
Potassæ Bicarbonat., ℥ij ;
Acaciæ, ℥ij ;
Aquæ Bullient., Oj. Solve et misce s. a.

Should this be required to keep, two ounces or more of some spirit must be added.

should the pain not abate, but, on the contrary, the disease appear growing worse, blood ought to be let in quantity regulated by the consideration of the condition and strength and age of the patient. Two gallons, or but one, or any less or intermediate quantity may be drawn, according to the exigencies of the case.

Two hours after the first drench, a second one of the same composition may be exhibited; and a couple of hours after the second, a third; which altogether will amount to (since every ℥j of the decoction contains ℥j of aloes) ℥iiss of Barbadoes aloes, ℥vj of laudanum, and ℥xij of ether, swallowed by the patient; quite a sufficiency, in my opinion, to counteract and allay spasm, if not by a direct antidote at once, at some future period through purgation.

Should the decoction of aloes—that admirable formula—not be at hand, we must content ourselves with a simple solution of aloes in hot water; bearing in mind that the dose *in the whole* is meant to amount either to twelve drachms of Barbadoes aloes, or to two ounces of Cape. In a horse who was often “subject to colic,” and in whom none of the ordinary antispasmodics, or olive oil, or nitre, or emetic tartar, did any good, Sig. Cantiello, veterinary surgeon to the Queen of Naples, succeeded perfectly by exhibiting half an ounce of the extract of belladonna; and this is what I would strongly recommend the trial of. (VET. for 1839, p. 487.) I have given chloroform in lieu of ether without success.

EXERCISE.—The common practice, supposing the attack to have just commenced, is to give an antispasmodic drink or ball, and immediately after, to send the horse out to be exercised for twenty minutes or half an hour; the old rule in regard to pace being, that he may be trotted, but not so as to be made to perspire. I feel quite persuaded that exercise, taking it for granted that the case is one of genuine colic, is often productive of a great deal of benefit; and therefore I am not so scrupulous about the pace (though I do not approve of sweating) as some are: it increases the peristaltic motion, causes often the expulsion of air and

ding, and so tends rather to relieve than to augment the spasm. For all this, I do not mean to say I would violently urge on a reluctant or unwilling patient with whip or spur: far from it, should he appear to be in such pain as to render him almost unable to move, I certainly would be the last to compel him.

BLOODLETTING is not needed until we have had a fair trial of the antispasmodic medicine and of exercise. The case growing desperate, our remedies must be potent and impressive. A large bloodletting is very often succeeded by a copious sweat; and so desirable an effect should be as much as possible encouraged, in the present instance, by warm clothing, &c. Should the case continue unrelieved, another venesection may be called for; but at what time and in what quantity the practitioner in attendance can alone determine.

The French veterinarians, though not in general advocates for bloodletting, are very loud in their praise of venesection in colic. "We have seen (says the *Compte Rendu* for Alfort, for 1841-2) horses in an absolutely furious state from an attack of colic, whom we have been compelled to shackle while bleeding, on account of their precipitate and dangerous movements, become calm and quiet after the abstraction of about twenty or twenty-five pounds of blood. [*VETERINARIAN* for 1843.] And in the same Report for the next year, we find the following:—

This practice (bloodletting), long adopted in our hospitals, is based on this incontestable fact, that, whenever the intestinal pain announces itself by any violent movements, there is one or another of these causes, either congestion in some isolated part, or extending through the intestinal canal. (*Ibid.*)

CLYSTERS.—A clyster composed of two ounces of Cape aloes dissolved in six quarts of soap-water or gruel, may be administered after trial of the simple soap and water clyster; or one in which a pint of oil of turpentine is substituted for the aloes may be given with a view of relieving the spasm. But what, in a case of any danger, is better than either, is the clyster of tobacco, either in the form of infusion or

smoke, the latter being, from reason of its more penetrating nature, and the length of time we are enabled to persevere in it, I believe, the best. The infusion of tobacco is made by pouring upon ʒij of common shag tobacco, a gallon of boiling water, and covering both down in a closed vessel, and suffering them to remain until of a temperature for use ; then decanting, and straining, if necessary, the liquor off. This altogether will take about half an hour.

The ENEMA OF TOBACCO SMOKE is managed very well with the one of Read's patent syringes used for common clysters. It is only necessary to have made a metallic box for containing the tobacco, with a cribriform plate across the inside, for transmitting the fumes, which, as they rise, are, with only force enough to raise and depress the piston of the syringe, pumped into the rectum, and continued to be so during the whole time (about a quarter of an hour) that the tobacco remains in ustion. Occasional discharges of the smoke from the rectum take place during the operation, with sometimes emissions of fæces, for which latter, but not for smoke alone, it will be right to withdraw for a moment the clyster-pipe. In this manner have I, before now, elicited fæculent discharges when all other means have totally failed. I have found, however, that, providing no effect be produced at first, it is of no use persevering, at least beyond the second or third injection, since further than that, tobacco appears to lose its power of stimulation.

A WARM BATH would certainly prove a most desirable situation for our patient, could one be procured. In the absence of it, Mr. Wardle, in a moment of danger, plunged his patient into a dung-heap, the result of which was complete recovery after having been buried twenty minutes. A sackful of hay, dipped in water nearly boiling, and bound upon the belly, can be easily managed, and would be likely to relieve him.

COLD AFFUSION has achieved wonders in human medicine ; but, though I have practised it, I cannot yet speak of its efficacy in veterinary. Buckets of the coldest water to be procured may be dashed upon the belly with some force

even while the horse is standing, and with a great deal more facility and effect while lying.

FATAL CASES.—The following relation will show that cases of *pure colic* will every now and then occur, baffling all ordinary treatment, and calling for measures of the most desperate kind we are able to employ.

In March last, a troop-horse, who from some idiosyncrasy had been the subject of two or three very violent attacks of spasmodic colic, which induced me to say, that some day he would die of the disease, returned to the infirmary with—I forget whether it was a third or fourth—"fit of the gripes." Knowing my subject, I at once proceeded to the most prompt and energetic treatment: but, this time, in spite of all that could be done, my patient, unfortunately, verified my prophecy. He was attacked at three o'clock p.m. on Wednesday, and died at nine o'clock a.m. on Saturday.

Autopsy. All sorts of morbid appearances usual on such occasions had, in visions, run through my mind in the course of my attendance. I imagined there might be some volvulus, or knot, or intro-susception, or calculus; but then, no symptoms of mortification had come on, nor were there such decided signs of fever as we expect to find in inflammation. It had all along appeared a case of *pure colic*, accompanied with complete stoppage in the bowels; and such it proved. The opening of the abdomen exposed the bowels of their usual white glistening colour, and entirely free from inflammation. At least a dozen places in which the gut was contracted, from four to six inches in extent, appeared in the length of the jejunum and ileum; and so close and firm were these contractions, that even after vitality had left them, did some of them resist the insufflation of air through them; blowing through a pipe, as I did, with all my force. The stomach was very much distended with air: and how could it be otherwise, when not a particle of it could permeate the spasmed intestines? But the intestines themselves—the uncontracted portions of them—were, likewise, tympanitic. And, as for all the medicine that had been given, none of it appeared to have reached beyond the extent of fourteen inches along the duodenum.

Here is A CASE FOR REFLECTION—a case showing that, even in pure spasm, under certain conditions, dose the suffering animal with what we may, little benefit can be expected to result. I do not believe that all the medicine in Apothecaries' Hall would have caused relaxation of this horse's cramped intestines. What then would?—I cannot say. I can only repeat, do not exclusively rely upon internal antispasmodics; but, from the moment they appear to fail, have recourse, *at once*, to such remedies as will be sure to make such an enervating impression upon the system as will tend to diminish the force of muscular contraction. If requisite, bleed until the patient actually falls prostrate from loss of blood; and as soon as he has recovered the effects of that evacuation, exhibit tobacco-enema, potent enough and copious enough to make him reel; and dash buckets of the coldest water that can be procured, with as much force as can be used, against his belly. These are the remedies, in my opinion, *most likely* to succeed in such case: if they do not, recourse may be had to mercury, for the exhibition of which directions will be given under “enteritis;” a disease which the colic by this time has very likely run into.

TYMPANITIC COLIC.

FLATULENT or wind colic—not so frequent in its occurrence as the spasmodic—has already, in one of its forms, viz., that of *tympanitic stomach*, come under consideration; and, while treating of that, the present one has necessarily had notice taken of it—the two being essentially the same disease. The symptoms likewise they occasion, so much resemble those of spasmodic colic, or “gripes,” properly so called, that, were it not for the marked remissions attendant on the one, and the distension of belly which characterises the other, we should find it impossible to diagnosticate between them. The patient's abdomen is visibly blown out—inflated all round the inferior and lateral parts, which are distended like a drum; the condition, in fact, we every now and then observe in inveterate crib-biters.

THE SEAT OF INFLATION is the large intestines—the cæcum and colon: were it the stomach alone, we should have no such outward and visible signs of the distension. And the

CAUSE of it, is either indigestion or crib-biting. It may result—and I believe often does—from spasmodic colic: the spasmed condition of the intestines interfering with the passage through them, and consequently with the process of digestion.

THE CONSEQUENCES of this inflated bowel may be such as to place the horse in the same perilous state as the hoven ox, an extreme case that will, perhaps, warrant the employment of the same remedy; though it must be borne in mind, that, as the two animals have differently constructed alimentary apparatus, an operation which may prove quite harmless in one might be attended with great danger, or even loss of life, in the other. This, however, in the present instance, we are assured is not the case. Both in France, and in our own country, the abdomen has been trochared, not only without that danger which might have been anticipated, but with such results as would lead, in all hopeless cases at least, to a repetition of the operation. Of this, an account has been already given under “Tympanitic Stomach” (at p. 265-6). I may here repeat, that the trocar used for the intestine, ought to be not larger than that used for hydrocele by surgeons, but, at least, twice as long. Sir Henry Marsh has relieved cases of excessive distension of the abdomen from flatus, (in the human subject,) by introducing a *fine* trocar.

ENTERITIS.

The intestines are composed of three layers of substance, called *coats*, any one of which may become the seat of inflammation, to the exclusion—although all three are intimately connected—of the other two; or, at least, so far to their exclusion that the others appear to be but secondarily and comparatively mildly affected. Enteritis consists in an inflammation of the middle or muscular coat—that which

forms the principal substance of the gut. We have evidence of this when we come to slit open an enteritic intestine: although the exterior looks as red as scarlet, the interior is found to be hardly flushed. And even the aspect of the exterior is likewise illusive; for, if we now strip off the external or peritoneal coat, we shall discover that the redness is underneath, the raised membrane being in itself translucent, with only a red blood-vessel to be seen here and there, instead of such crowds of them as appear in the muscular tunic.

The SYMPTOMS of enteritis are, very many of them, so far as regards the expression of suffering, the same as are present in spasmodic colic. Indeed, it frequently occurs that inflammation and spasms are combined; though whenever inflammation by itself is present, in some stages it seems hardly less painful than the paroxysms of spasmodic colic. Want of appetite, dulness, and feverishness, commonly usher in an attack of enteritis. Should the disease, however, set in suddenly, still, it rarely manifests itself with the same precipitousness as colic. As soon as inflammation has taken hold, spasm, though not constant, may on occasions seize the bowel as well; and this must tend, for the moment, greatly to augment the pain. As in colic, therefore, the horse paws and stamps the ground; strikes his belly; cringes his body; makes feints to lie down; lies down; rolls, and, perhaps, upon his back; rises again; casts a dolorous look at his flank; pants, and blows, and sweats from pain. In some cases, pawing with one fore foot is so prominent a symptom that the horse will stand with his head directed into one corner of his box, and do nothing else but incessantly keep pawing the ground for hours together; having all the while a most anxious expression of pain in his eye; casting, ever and anon, doleful retrospects at his flank. His belly is tense, and painful to pressure, towards the flanks drawn up; and nothing is voided save a few hard, angular, dark-coloured dung-balls, and they commonly at the commencement of the attack.

In enteritis there is not that interval of quietude or remis-

sion from suffering so remarkable in colic ; while the pulse (instead of at one time being contracted to a thread, at another relaxed, and in number all the time natural) is full and firm in its beat, and from first to last accelerated, even to a high degree—to double, and in the latter stages, even treble its natural frequency. The continuance of his torturing pains drives the animal to a state not merely of extreme restlessness, but of real distress : he is either pawing, or repeatedly lying down and rising again ; or else he is walking round his box, breathing hard, sighing, and, perhaps, occasionally snorting. At length, his respiration becomes hurried and oppressed ; his nostrils widely dilated ; his countenance painfully vigilant, expressive of his sufferings ; his body bathed in sweat, at one time hot, at another cold, and occasionally seized with tremor ; his tail erect and quivering ; mouth hot and dry ; and (as Mr. Atcherley, V.S., Bridgenorth, remarks) the tongue becomes “peculiarly dry and contracted,” such as it does in no other inflammation.

The last stage borders on delirium. The eye acquires a wild, haggard, unnatural stare ; the pupil dilates ; his heedless and dreadful throes render approach to him quite perilous : in short, he has become an object not only of compassion but of apprehension, and seems fast hurrying to his end ; when, all at once, in the midst of agonising torments, he stands quiet, as though every pain had left him, and he were going to recover. In this state, sometimes he will make an attempt even to feed, and will drink fresh cold water. His breathing becomes tranquillised ; his pulse sunk beyond all perception ; his body bedewed with a cold clammy sweat ; he is in a tremor from head to foot, and about the legs and ears has even a death-like feel. The mouth, also, feels deadly chill ; the breath becomes tainted or absolutely fetid ; the lips drop pendulous ; and the eye seems unconscious of objects. In fine, death, and not recovery, is at hand. No dung has passed of any account. Mortification has seized the inflamed bowel ; pain can no longer be felt in that which but a few minutes ago was the seat of exquisite suffering. Should the horse be down at this time, he may

still muster strength enough to rise. Again, at the last, he becomes convulsed, and in a few more struggles, less violent than the former, he expires.

It does not invariably happen that a patient in whom the disease has terminated in mortification sinks immediately. I had, not long ago, a remarkable instance to the contrary. A horse of the Queen's Guard was seized with enteritis at half-past one o'clock in the morning. No medical aid was sought for him (and nothing, in fact, done for his relief) until half-past eight the same morning; at which time all convulsion from pain had subsided. Four quarts of blood were then abstracted; and afterwards I saw him, and ordered some opium in an aloetic drink to be given. At ten o'clock he walked, without apparent pain or difficulty, from the Horse Guards to the Regent Park barracks—a distance of upwards of two miles. On his admission into a box, his body was found cold, his mouth cold, his extremities very cold; his pulse small and quick; such as indicated to the feel "running down," or "sinking." He manifested no pain; but stood quite still, hanging his head, and looking hopelessly depressed and ghastly. He continued standing until four o'clock in the afternoon, every effort to warm his body having proved ineffectual. All at once his legs failed him, and he fell with his head twisted under his shoulder, and would, had not a man been in attendance, in that posture have died, strangulated. He rose once more; but shortly afterwards sank down a second time, and, after a struggle or two, expired. From three to four yards in extent of the ileum were found in a state of mortification.

THE SUREST DIAGNOSIS between colic and enteritis is to be found in the *history* of the case—in particular, in the *manner* of attack; in the intermissions; in the state of the pulse; in the progress of the case: all which sufficiently appear from what has been already stated. When the paroxysms are not such as properly characterise *spasmodic colic*—not so violent, nor the pulse thready; but, on the contrary, the fits of pain, though but occasional, are comparatively light, simple twitchings or *nippings* of the bowels, and the

pulse is full and strong, but not rapid, I suspect stoppage of bowel from some mechanical obstruction, such as lengthened constipation, calculus, volvulus, &c. At the same time, it must be borne in mind, that colic, should it prove obstinate or protracted, is very likely to turn to enteritis; and that enteritis does not often run its course without occasional spasm.

In former days, vital importance was attached to the diagnostics between colic and enteritis, and there are practitioners still who hold the distinction of great consequence. I believe I did so myself at one time, but experience in practice has altered my notions. I now, when the attack is violent and sudden, do not take much trouble to ascertain whether it be spasmodic or inflammatory, but at once make a quick and copious abstraction of blood, give the "gripe drench," and administer an enema. Supposing it is enteritis, there may be spasm present, and whether there be or not, the opium and ether will do no harm so long as it is combined with cathartic medicine; neither will the *drastic* purgatives augment inflammation or irritation in the *muscular* tunic of the bowels so long as the mucous lining intervenes; but, in the end, by the copious efflux it is likely to produce, confer a vast deal of service.

To the above observations I may add, that my present plan is to give: Decoct. Aloes, C. ℥iv. Spt. Æther. Sulph. —Tr. Opii, āā ℥ij, Aquæ Bullient. Oj. M. ft. In two hours' time, supposing no change or relief, I give the same drink, with only ℥ij (instead of ℥iv) of the decoction; in two hours more, symptoms continuing, the same drink as before: in two hours again repeat the same drink. This makes 3x of Barbadoes Aloes.

The CAUSES of enteritis are both numerous and various. We have seen that colic may give rise to it. Constipation may be viewed in the light both of cause and effect in relation to it. Collected hardened fæces must naturally prove not only of themselves irritative, but obstructive and subversive of the functions of the bowels; and, in either one or the other way, may lay the foundation for an attack of

inflammation. Certain kinds of indigestible food, calculous bodies, irritating matters of any sort in fact within the bowels, may cause an inflammation of them. Obstruction of any of their passages—whether it be from the lodgment and immoveableness of the matters they contain, or from entanglement of the intestines, or intro-susception—must, in the end, occasion inflammation. Over-fatigue, and consequent excessive irritation of bowel, will bring it on. Now and then, it will supervene upon a hard day's work, such as hunting; though this is a case in which the symptoms will be less violent, and yet often equally dangerous. Cold—from exposure, with skin wetted while hot, to a current of air—is commonly entered high up in the list of the causes of enteritis, and perhaps with propriety; though, for my own part, I must confess I have not met with so many cases from this as from other causes.

HERNIA, as in the case of unrelieved colic, must here also—should the patient be a stone horse—become an especial object of inquiry.¹

THE DURATION of enteritis, in all the intensity I have described it, cannot but be short. Destructibly violent and insufferably painful as bowel inflammation is, neither the part nor the constitution can withstand it for long: in from twelve to twenty-four hours, after it has once fairly set in, a decisive change may be expected: too often that change is—and but too likely is it to prove to be—dissolution.

RELAPSE has sometimes occurred, after the primary attack has been subdued, and the animal considered to be out of danger. I have seen the disease return a few hours after all had been put an end to through copious and timely blood-letting, &c.; and the second attack, in spite of all that could be done from the moment it set in, prove fatal. On this account, I recommend a *second* bloodletting, in cases even where the first has proved successful, two, or three, or four hours after apparent recovery, should the pulse appear at all to warrant it.

¹ For the mode in which this enquiry is to be conducted, consult the account of 'Inguinal Hernia.'

TERMINATIONS.—Enteritis may end in resolution, or rather in effusion. According to Hurtrel d'Arboval, it may terminate in hæmorrhage. Its too common termination is in gangrene or mortification: indeed, this is the inevitable termination when the disease is the result either of stricture, entanglement, or mechanical obstruction, unrelieved, of any kind. The small intestines—in particular the jejunum and ileum—are the common seat of the inflammation, when it has arisen without obstruction, or has followed spasm. The affected parts exhibit various patchy shades of redness, from the pink or scarlet to the purple, and even black hue; the last indicating that the part has become mortified, as, indeed, its softness and rottenness of texture satisfactorily demonstrate. This portion of the gut commonly contains air, and now and then exhibits, when cut into, masses of dark-coloured congealed blood. At the same time, it is common to see effusion of water into the abdominal cavity.

On occasions it happens, when the case prove protracted, that the inflammation subsides, a passage becomes restored *per anum*, and all appears to be going on well, save that the animal evinces a difficulty of moving his limbs, his *fore* ones in particular; and perhaps his legs swell from his refusing to lie down. When this is the case, be very suspicious of the inflammation having, by *metastasis*, settled in the *feet*, (the fore ones most likely, though the hind ones may be affected likewise,) and *laminitis* be the result. Such an unexpected termination as this, has, before now, led ignorant or fault-finding owners of horses to accuse the veterinarian, in attendance on the case, of want of knowledge of his profession; with the gentle inuendo, that he had thought the disease was in the bowels, when it had turned out to be in the *feet*!

MORTIFICATION MAY ENSUE IN EIGHT OR TEN HOURS.—The case related at p. 330 warrants this conclusion. The horse was attacked at half-past one o'clock in the morning; at half-past eight o'clock all convulsion from pain had ceased—he had become quite tranquil. This rapid and destructive course of inflammation seated in the bowels must be borne

in memory, as a fact forcibly impressive of the extreme importance of putting what we determine on doing for the animal's relief into *immediate* execution. This leads me to say,

The TREATMENT of a case of inflammation of the bowels requires, on the part of the practitioner, no less promptitude than judgment: without the one, the other will, indeed, avail but little. The rapidity of the inflammation; its tendency to mortification; and the poignant pain and irritation, and consequent fever, the animal all the while is suffering, vehemently urge us to the adoption of measures, not only of ready application, but of speedy effect. The first and grand thing to be done, is to let blood from the jugular vein to the utmost extent the patient will bear: the blood-can ought not to be taken from the neck until evident prostration demands it. Should this come on prematurely—should the horse stagger and appear faint from loss of blood, although but a few pints have flowed, pin up the vein, and administer to him his drench, and an injection; and then, should his strength seem revived, have recourse once more to the fleam; for blood he *must* lose, and in large quantities too, since upon that mainly depends his recovery.

MEDICINE.—There used to be—I believe there still exists—scruples about exhibiting aloes in enteritis; although on all sides it is admitted that it is a case that calls most loudly for medicine, cathartic; or, at least, for a complete evacuation of the bowels; and no one denies that it is the *muscular*, and not the mucous, coat of the bowel which is the seat of the inflammation. For my own part, I no longer hesitate to prescribe *aloes* in solution, in combination with opium, the narcotic being now considered by the best veterinary practitioners to be the appropriate remedial agent we possess for colic, and certainly not an inapplicable one for enteritis. I would therefore give, in a pressing case immediately, the following drink:—

Decoct. Aloes, Oj;

Opii, ʒj;

Aquæ Bullient., Oss. M.

Dissolve the opium in the boiling water, and add the decoction.

In regard to the administration of *oil* in this disease, I do not myself hold with such practice; simply, because I view it, on one side as next to inoperative or inert, and, on the other, should it come into action, as dangerous. Olive and castor oils are little worth as horse medicines; and linseed oil, in the dose to ensure its effect—a pint or a pint and a half—is not exhibited without incurring danger from its operation. Barbadoes aloes is incomparably the most safe and efficient cathartic we possess for horses; and I can, for my own part, see no objection whatever to its employment either in colic or in enteritis.

CLYSTERS constitute an important part of the treatment. The common soap and water enema may be commenced with; and this, followed up by an aloetic injection; or, in case of emergency, by the tobacco enema, proves very effectual: in fact, should the tobacco smoke enema, after two or three administrations, be found to fail of affording relief, clysters may be abandoned as powerless in the disease. The prescribed forms for them will be found under “Colic” at p. 324. The prussic acid enema, made by mixing from ʒi to ʒij of the acid with a gallon of water, may be made trial of, if thought prudent.

OTHER REMEDIES.—The next thing required to be done, is *raking*—removing, as far as the arm will reach, every portion of *fæces* from the rectum; and this should be immediately succeeded by the injection, with the patent syringe, of copious aloetic clysters.¹ Hot flannels wrung out from boiling water may be attempted to be applied to the belly, or a sack or bag filled with hay, and dipped in scalding hot water, may be bound up close against it, or a sheep-skin but just flayed is a good application, providing it can be confined upon the surface: but, unfortunately, there is generally much difficulty in accomplishing these soothing remedies, and sometimes considerable danger, to the persons engaged, in their application. A mustard embrocation—made by

¹ Vide the clyster ordered for colic. The first time, give the purging clyster; after effect, the soap and water, without the aloes; in extremities, the tobacco-enema.

pouring boiling vinegar slowly upon mustard, and stirring them together to a proper consistence—can at all times be rubbed on; and I am not certain that it is not in the end more serviceable than temporary heat. A terebinthinate tincture of cantharides—made by steeping an ounce of bruised cantharides in half-a-pint of spirits of turpentine, in a stopper bottle, and kept ready for use—may be employed instead of the mustard: it is calculated to relieve, not only as a blister, but as an instantaneous counter-irritant. Some dash boiling water upon the belly. The late Professor Peall used to recommend that the surface be cauterized with a broad flat firing-iron. Mr. Hales, of Oswestry, has a warming-pan full of hot coals passed over the belly. Mr. Atcherley used the actual cautery to the abdomen “in the form of a large shovel, made *red hot*,” in the last stage, with success. Three or four hours after the first blood-letting, should no change or abatement take place, a second venesection, though not to the same depressing extent as before, followed by the exhibition of another opiate drench, (the aloes, after the first one, being omitted,) will probably be called for; and a couple of hours after that, even a third repetition of the opium: all this, however, must so entirely depend upon circumstances, that no unalterable rules can possibly be laid down.

A DERNIER REMEDY we still possess, should the case prove protracted enough to admit of its trial. Several years ago, from knowing the extensive and advantageous use surgeons in their practice applied Calomel and Opium to, I resolved to give it a trial in our own; and I feel now some pride and much satisfaction in being able to add, that the experiment turned out of good account. The moment other (foregoing) remedies seem to be wanting in any good effect, I commenced employing Opium and Calomel, giving the following ball every four hours:—

R Hydrarg. Chlorid. ʒij;
 Pulv. Opii, ʒj;
 Far. Avenæ, ʒiv;
 Terebinth. Vulgar. q. s. ut. f. Bol.

Under its administration the mouth will require watching. The first sign of its entering the system will be tainted or fetid breath; the next, reddening of the gums. There is no need, in fact it is not prudent, to push the mercury to salivation; indeed, it not unfrequently happens that before the mercury can be traced coming, constitutionally, into action, the disease is found giving way under its influence; when it is advisable altogether to discontinue its exhibition.

As for food, the horse will take none; and even were he so inclined, he should not be allowed any. He will, probably, drink; and he may, with advantage, be suffered to drink as much gruel or white water, or even plain water providing it be chilled, as he pleases: fluids will assist in bringing on purgation. Let simple soap and water or gruel clysters be frequently repeated. Also, repeat the embrocation or blister to the belly, should it not be found taking effect in six or eight hours.

VOLVULUS.

Lengthy and loose and convoluted as the horse's intestinal tube is, it need raise no wonder that portions of it, on occasions, become twisted or entangled; on account whereof all passage through its canal is arrested. Some highly instructive cases of this description have appeared in 'THE VETERINARIAN:' indeed, enough of them have of late years come to our knowledge, to convince us, that such mishaps are of less rare occurrence than some twenty years ago we seemed to have had any notion of. The case which, from its comparative frequency, has attracted the most notice, is that where a new-formed body growing from the mesentery—commonly a globular adipose tumour—has, by means of a long chordiform pedicle by which it is attached, wound itself around a portion of ileum, doubled in a manner to form a sort of knuckle, and so has strangled the intestine. An instance of this occurred in my regimental practice in 1827. In 1829, the particulars of a similar one were published in 'THE VETERINARIAN' by Mr. W. Goodwin,

accompanied with an illustrative engraving, which represents more naturally the state of the parts than anything of the kind I have met with. Mr. C. Percivall has related, in 'THE VETERINARIAN' for 1830, a case, in which the ileum proved to be in itself "twisted and thus strangulated, close upon its termination in the cæcum."¹ This is a favorite spot for volvulus to happen in.

The SYMPTOMS this internal stricture and strangulation of intestine produces are, in general, violent to a degree, though similar in many respects to those resulting from colic, or, rather, enteritis. The poor sufferer paws, and lies down, and rolls, and looks at his flank, and pants, in horrible agony; his belly becomes tense and tympanitic; his pulse is quick and small—70 or 80—but not thready; at least, I have not found it so. For the first half a dozen hours, all that we do appears of no avail. Afterwards, a calm takes place, and we are apt to think our remedies have induced it; let us, however, but examine the pulse and we shall find our patient is evidently sinking; perhaps, at this very time, is all over in a tremor and cold sweat; and this deceitful calm proves nothing but the too certain precursor of mortification. The animal commonly dies in convulsions.

DURATION.—Two of the cases to which I have alluded survived forty-eight hours; the other sank in six hours after the attack.

RUPTURE OF THE INTESTINE has followed entanglement. A curious and interesting case of this description² happened in the practice of Mr. Pritchard, Wolverhampton.

A cart-horse continued experiencing fits of gripes every three or four days, which were sometimes relieved by

¹ A fatal case of volvulus occurred to me, in which a knuckle of the same portion of the ileum was found insinuated and strangulated within the peritoneal passage through which the duodenum crosses the spine; the horse, with violent symptoms resembling "gripes," having so great a propensity to lie down that he could not be kept upon his legs at exercise. Remedy of all description failed to afford him permanent relief; the tobacco enema seemed to give him temporary ease. He lived nearly forty-eight hours; but an hour before death appeared to have become free from pain.

² Detailed in the 'Veterinarian,' vol. iii, p. 95.

medicine; at other times worked their own relief. The attacks afterwards became more alarming; the animal lost flesh, and was no longer capable of work. In December, he died. On opening the body, a strange "scene of entangled intestines" presented. Many of the convolutions of the small intestines were "entangled by three distinct cords, consisting of torn portions of omentum, which membrane was very much thickened." Though "so much fettered," no strangulation appeared. A strong, dense, firm ligature, of a dark colour, enfolded the base of the cæcum, which was formed by the mesocolon. "Between this ligature and the *caput coli*, to the left side, was a rupture, two inches in diameter;" through which quantities of liquid feculent matter had escaped.

INTRO-SUSCEPTION.

INTUS OR INTRO-SUSCEPTION means the slipping of one portion of intestine into another—commonly into the one behind it. In the human subject, especially in children, this appears to be an accident by no means uncommon, and one that happens and rights itself again without any knowledge on the part of the subject in whom it occurs. I would not take upon myself to say that such vagaries were not played among the bowels of horses; though it seems unlikely that they often occur from the circumstance of our meeting so rarely with anything of the kind in our post-mortem inspections. Foals are most liable to it. Mr. Cartwright attended one, five weeks old, for quick respiration and pulse, and dropsical swelling of one arm, of which he appeared to die. On opening the abdomen, however, Mr. C. was surprised to find extensive intro-susception of the ileum. The small intestines are oftenest intro-suscepted: the French veterinarians have recorded some cases. In another case mentioned by the same gentleman, the small intestines were found *thickened* in substance, and were "in twelve or fifteen places intro-suscepted." A third case, of a foal only "a day old," in which, about four yards from the stomach, "a foot of small intestine was drawn completely into another portion of gut. It had descended from above into the

intestine below. The parts were almost "sphacelated." Mr. Cartwright is inclined to think "that this was originally a case of spasmodic colic;" and that in the fit "one portion of gut had been drawn into the other." (*VETERINARIAN*, 1845.) In '*THE VETERINARIAN*' for 1843, Mr. Walker, V.S., Southam, mentions a case of a cart-colt, five weeks old. The animal suffered much with enteritic symptoms for several hours; after death it was found that "a portion of the ileum had passed into the same intestine situated *posteriorly* to it, to the extent of more than two feet. And this was in a state of decomposition, &c." But Mr. Hales, of Oswestry, met with an instance of the *whole* of the cæcum being inverted and received within the colon, the former being in a state of inflammation bordering on mortification. This horse suffered violent paroxysms of colic for four days. The late Mr. Turner, V.S., Montreal, sent a case to '*THE VETERINARIAN*' in 1849, in which "no less than sixteen feet four inches of the ileum had become inverted (invaginated)." Mr. Dunsford, V.S., London, attended an aged horse for influenza, who the following day was attacked in Mr. Dunsford's own stable with sudden violent colic pains. He died in ten hours. And there appeared—besides "considerable inflammation" of the peritoneal coat of both large and small intestines, more especially of the *cæcum and colon*, which were in an active state of decomposition—protrusion of the ileum for eighteen inches into the cæcum. (*VETERINARIAN*, 1842.) In cases of obstructed bowels, the pain is less acute and violent than in colic, though there may be, and generally is, I believe, intermissions of freedom from pain, which again distinguish the case from enteritis, wherein the pain or suffering is constant. Again, when the case becomes protracted to three or four, or more days, it is pretty certain it is *not* colic; and as the expressions of pain, and the pulse are at times quiet, it is equally certain inflammation is not present. (*Vide* '*VETERINARIAN*,' 1843, December.) *Sighing* is often a prevalent, and I believe ominous symptom, in hopeless cases. We have little else to lead us to a suspicion of these and such-like internal

accidents during life, but the extraordinary violence of the symptoms, and the total inefficacy of all the means we employ.

PATHOLOGY.—I have long imagined—and I find I am far from being singular in entertaining such a notion—that, on occasions, it happens that cases such as I have been describing are the result of common colic; that, in the commotion excited among the intestines, some of them get twisted, entangled, or intro-suscepted, or worm themselves into situations from which they cannot withdraw themselves again. Still, however, many cases occur in which, from the change of structure apparent, as well as the adhesions present, it is evident that the contrary is the correct pathology; and that the mishap, whatever it may be, has existed for some considerable time before.

The **MORBID EFFECTS** consequent upon these internal strictures are, inflammation in its various forms and stages, from the pink hue of the peritoneum, and of such intestines as are remote from the place of stricture, to the black and gangrenous condition of the parts immediately implicated. The intestines not only exhibit these various shades of redness; they are often found to be actually of different colours, some being red, some green, some black, while others remain unchanged—white.¹ Those guts that are anterior to the stricture are commonly distended with air: the rest are flaccid. The coats of such of them as are involved in the stricture are often enormously thickened from interstitial effusion. In Mr. Goodwin's case, the coats of the colon proved "almost three times their natural thickness;" also a great deal of blood—sometimes congealed, sometimes fluid—is occasionally found in their cavities. In the case related by Mr. C. Percivall, and in the one mentioned of intus-susception by Mr. Cartwright, the strangulated gut presented the appearance rather of a mass of extravasated blood than intestine. In addition to which, in Mr. Percivall's case, there were from three to four gallons of fluid within the cavity of the belly.

¹ Care must be taken not to confound with these the changes of colour which ensue after death.

DIAGNOSIS.—The only distinguishing symptoms I have been able to detect in such cases as *volvulus* or *intus-susception*, are—instead of the animal lying down and rising continually, and pawing and stamping, and evincing all that restlessness he does in *colic* and *enteritis*, he generally manifests the greatest propensity to lie down: lying down and remaining down, only trying from time to time various new postures for relief, such as lying now upon his side, then rolling upon his back, and afterwards by stretching out his fore legs, placing himself upon his belly, and from thence raising himself upon his hind quarters like a dog; groaning all the while, and casting many a dolorous look backward at his belly. He will seldom rise of his own accord; but you may rouse him up: no sooner, however, is he up, than he begins turning himself round, with his nose poking down, looking about for a fresh place to lie down upon. The pulse is not quick, but soft: and nowise thready or contracted.

TREATMENT.—In the beginning, these cases either really are, or are to be regarded as, “*gripes* ;” and as, nominally, such are to be treated. After the lapse of some hours, finding our patient not amending, and the symptoms manifesting extraordinary urgency, we for the first time, probably, entertain suspicions that entanglement, or *intus-susception*, or internal stricture, or obstruction of some kind or other, must exist; but of what nature, or whereabouts, we are, and are likely to remain, in complete ignorance. In this state of mystification what is to be done? Some farrier of olden days answers—“thrust an eel down the patient’s throat, in order that it may crawl through the interrupted passages, and thus right them!” Human physicians of former ages recommended that mercury should be poured down the throat, with the intention that, through its weight, it might penetrate from the stomach to the anus, and in that manner permeate the passages: and did the intestinal tube pursue a straight line through a man’s body, the project would be feasible enough. As matters stand, I know really of nothing that can be done by way of remedy, unless we adopt the forlorn expedient of

Fromage de Feugré, of making an opening into the flank sufficiently large to admit the hand, and, with it introduced, endeavour to rectify whatever may be found amiss. I much doubt whether a horse would survive such an operation. Even supposing there was a chance of the animal's survival, however, such cases as these are ever enveloped in so much obscurity and doubt, that I do not think the operator with his groping hand at all likely to discover their true nature, even should he feel out the seat of the mischief.

CONSTIPATION.

Nosologists have varied in opinion in their views of this pathological condition, some regarding it as a state or *genus* divisible into kinds or degrees, others looking upon it as but one distinct *order* of disease. It may either proceed from habit, or be the result of some other disease proving a cause of obstruction. Some writers have, and with reason, made a difference between *costiveness* and *constipation*: the former being but a temporary or slight obstruction, and one originating in habit, or in faulty digestion of some kind; while the latter is apt to be enduring and permanent, and may proceed from causes of difficult or impossible removal.

COSTIVENESS is a condition of bowels not uncommon to horses standing constantly in stables, highly fed, and in high condition, and especially when their provender consists in a great measure of grain and pulse, such as old beans, while their work or exercise is incommensurate with the heating properties of such high feeding. Increase of walking exercise given to horses so disposed, or the substitution of mashes for their night's feed, twice or thrice a week, will serve often to counteract the febrile disposition induced by such keep; though, should it at any time amount to anything approaching to constipation, cathartic medicine ought to be employed. Dr. Cullen was of opinion that costiveness, in the greater number of cases, arose principally in consequence of the absorption of the more fluid parts of the alimentary and faecal matters; and there seems reason, when one comes to consider the quantity of fluid ordinarily taken in with the

ingesta, to regard this as the correct view; and what tends in measure to confirm it, is the deprivation or shortness of supply of water many highly-conditioned and highly-fed horses are doomed to undergo—a practice originating in false notions about giving but a certain or regular quantity of water at *night-feeding*, a time when the supply of drink to every description of horse ought to be unrestricted.

CONSTIPATION, truly or pathologically so-called, may be said to arise from causes which call for the interference of medical aid for their removal. Inveterate costiveness may at times become so prolonged as to produce a state of constipation (as it is sometimes called *obstipation*) arising either in accumulated quantities of retained fæces, owing, perhaps, from some torpidity of function in the bowels, more probably of the larger than the smaller guts, and in particular of the colon, which is the common bed of lodgment of such accumulations. Collections of dung detained for any unusual period in capacious chambers like the colon, become dry and hard, and ultimately caked and matted together by the secretions so as in the end to form what are called dung-balls: occasioning obstruction, which, unrelieved, grows dangerous in the extreme. Should attention not be attracted to the horse, owing to the constipated state of his bowels, after a time inflammation will be liable to seize the distended bowel, which speedily hurries on even to sphacelation, or to a state of ulceration, with mortification, giving rise at first to symptoms of colic, though, subsequently, to those of deceptive ease and quiet, notwithstanding the case is at this very time hastening to its end.

It is possible, such lengthened constipation may, with other circumstances, lead to some suspicion or demonstration of the plugged and loaded bowel. I remember hearing the late Mr. King, V.S., Stanmore, state, that, on one occasion, being called in to a case of this description, and feeling assured that the cause was an obstructed colon, he, as a dernier resource, made an opening with a scalpel into the flank, introduced his hand, and broke down the mass of obstruction, which was followed by copious emission of fæces. The

remedy, however, proved no less fatal than the disease. A good deal of information is to be obtained in such a case as this by a thorough examination of the rectum: this, in conjunction with inspection and feeling of the abdomen, will now and then afford a clue to the nature of the existing stoppage, and thus offer some prospects, faint though they be, to the solution and recovery of the case. By means of an elastic (bougie-like) tube, which through its pliability, may follow the flexures of the gut, and penetrate farther along the canal than an inflexible clyster-pipe, clysters may afterwards be forced up to reach nearly, or quite as far as the obstruction: and above all injections, tobacco-smoke will be the most likely to permeate to such an extent. This smoke enema may be administered through the same apparatus (Read's syringe) as the ordinary clyster is: the syringe requiring only, for the ignition of the tobacco, a metallic cylinder or box to be fixed to the nozzle of the syringe.

The annexed woodcut will show the method of applying the apparatus. Two men are wanted to work it properly.



In regard to internal medicine, none is worthy of greater reliance than doses of aloes in solution, repeated as often as seems required, and can be borne. That failing, croton powder, which is more effectual than the oil, may be given, either in ball or floating in powder upon the aloetic solution.

Constipation being an ordinary symptom in enteritis, our remedies to relieve it must be directed to the inflammatory disease causing it, rather than to the constipative condition itself: and between such morbid states, we ought to be early in making satisfactory distinction. When dung-ball, or other kind of intestinal concretion is present, filling the cavity, we shall, in general, in vain use means to relieve the case: it is but too surely fatal in the end to admit of any hope or possibility of relief.

INTESTINAL CONCRETIONS.

CONCRETIONS or "stones" are found in the stomach as well as in the intestines: of which we have recently seen recorded cases, such as no longer leave room for doubt or further question on the subject. Within the intestines they are oftentimes discovered at the slaughter-houses, and by the knackers are brought to us for sale; in which way we may soon make a collection, though, probably, without being able to glean the history of hardly any one of them. Commonly, they are found in the large guts; sometimes, in the small: their ordinary place of lodgment appears to be the colon. Mr. Karkeek reports a case in 'THE VETERINARIAN' for 1836, whose history he obtained from a farrier, in which the "stone" was said to have been lodged in the point of the cæcum. Mr. Goodwin mentions an instance of the *small* intestines being obstructed by calculus.

NUMBER, MAGNITUDE, and WEIGHT.—There may exist but a single stone; there may be several: or, like pebbles, calculi may and do occasionally collect in very considerable numbers. I have seen hundreds of small stones taken

out of one horse. Their magnitude bears much relation to their number. I had one that measured eight inches in diameter when sawn asunder; and it weighed forty ounces. Opposed to this, I have possessed numbers not weighing as many grains each. One brought by Trump (a farrier of the 1st Life Guards) to show me (at Hyde Park Barracks, in May, 1843), weighed 21lbs.,¹ and measured in circumference, lengthwise $27\frac{1}{2}$ inches, crosswise 25 inches; and was of the hard lamellated description—the ammoniaco-magnesian phosphate.

A calculus of the same description (viz., hard and lamellated—the ammoniaco-magnesian phosphate), brought to Regent Park Barracks, June, 1851, by the foreman to Trew, coal merchant, weighed 17lbs.,¹ and measured in greatest circumference 26 inches, and in greatest diameter 9. In shape it was a flattened oval.

In FORM and COLOUR calculi also vary a great deal. Every stone possesses a *nucleus* of some kind, or central part, around which the calculous matter collects, and this ordinarily regulates the form it is to take. Any hard body the horse happens to swallow may become such nucleus: pebbles, portions of grindstone, grit of any sort, &c. I had a stone in which a horse-nail formed the nucleus, as its external shape, indeed, would have led any one to imagine. Sometimes, however, the shape of the calculus will be determined by the place in which it happens to be lodged: many found in the colon are lobulated, like collected dung-balls, from having taken the form of the cells of the gut. Their colour depends, for the most part, upon their composition. The hard stones are generally white, or white streaked with red. The softer ones are dung-coloured, or of a dirty-black hue.

There are THREE KINDS of intestinal concretions. One is hard and exclusively earthy in its composition, bearing much resemblance externally to our common pebble; though when fractured it is found to be made up of thin fragile strata, arranged after the manner of the several concentric

¹ Calculi lose their weight from age, by loss of moisture and desiccation.

lamellæ of an onion. The earthy matter has been found by Fourcroy and Vauquelin to be an ammoniacal magnesian phosphate. Girardin examined one, which he found to consist of:—

Ammoniac-phosphate of Magnesia	48·
Phosphate of Lime	19·
Water of Composition	14·
Animal Matter	·80
Soluble Salts, &c.	6·60
Extractive Matters	4·
Fatty Matter	7·
Loss	·60
	<hr/>
	100·

The second kind, soft, loose, friable, and without distinguishable lamellæ in its structure, appears to be a composition of earthy and mucous and stercoraceous matters mingled together.

The third kind consists of dry hardened dung; and masses of imperfectly changed hay and corn, and, perhaps, straw as well, agglutinated together by the mucus of the bowels. There is a fourth kind—a ball composed of hair; but I am not so sure about this being found in the horse: in cows, who lick themselves, the production is common enough.

WHY CALCULI SHOULD FORM in a horse's bowels has no right to surprise us, when we know that, on occasions, not only is much dust swallowed with his food, but that the voracious feeder is disposed, whenever he has the opportunity, to lick up and swallow a great deal of dirt. Horses picquetted while troops are encamped, will commonly first tear up and consume every blade of grass or weed within their reach, and afterwards will eat the roots, even the very earth in which they grow; a propensity not, perhaps, natural to them, but one engendered from being dissatisfied with their scanty rations, as well as from having nothing else to divert attention when their food is consumed. Even in the stable, dusty hay is often given; and oats full of grit and fragments of stone. Millers' horses are said to be especially

subject to these formations, from the circumstance of their food consisting principally of bran and mill-dust. The mill-stones must necessarily impart more or less of their substance to whatever they grind into dust or meal, and this gritty or calculous matter it is which becomes afterwards the principal component of the concretion.

SYMPTOMS.—Numerous instances have occurred of nothing having been known or suspected of the existence of calculi, until they have been accidentally discovered after death. Indeed, from what knowledge we possess of them in living bodies, it would appear that they rarely trouble the animal in any way during their collection or formation; not at all, indeed, until their volume proves such as to block up the passage; and then (the same as an internal stricture) they bring on inflammation of the bowel, mortification, and death. It is possible they may, however, without obstructing, irritate the bowel, and in that manner occasion the horse paroxysms of pain, giving rise to symptoms indistinguishable by us from enteritis. Mr. Hurford, V.S., 15th Hussars, remarks to me, it is surprising what a quantity of dirt (gravel and clay) the horses in India, picquetted out in the open air, will eat; he has seen the mucous lining of the colon coated with mud. In another case, which recovered, Mr. Hurford weighed the quantity of gravel passed daily with the dung, and found it in the end to amount to 12lbs. 1½oz.! When the bowel becomes obstructed, the horse is attacked with what is supposed to be ordinary “gripes;” and treatment in accordance with such belief is at first instituted. The pulse, however, does not become thready, as in colic, neither is there any excitement in its beat denotive of inflammation. But the pains grow sharper, and continue undiminished, without any decided or lengthened remission of them as happens in colic, and they in this manner continue until inflammation, which has now attacked the gut, has ended in mortification of the obstructed parts of it; and then they all at once subside, and are apt by their cessation to give rise to the deceptive belief that the animal is about to recover. All the while there is, of course,

unrelieved constipation : such dung as passes, coming from the passages only which are posterior to the obstruction : there also commonly is a good deal of flatus discharged, accompanied mostly with tympanitic distension of the belly.

EFFECTS.—It is surprising what a length of time these cases will endure before death, which, though from the first inevitable, comes to put an end to their sufferings. One case¹ I had lasted thirteen days ; another, eleven. These days are *critical*. The colon is the seat of obstruction in almost all such cases, though occasionally the rectum has proved to be so. Sometimes it happens that, before death, a passage of fæces takes place ; which appears to be owing to relaxation of the spasmed intestine, around the calculus, prior to dissolution.

TREATMENT.—Supposing, from the animal's habit of feeding, or from some calculous matter having been observed in his dung—circumstances both very doubtful in respect to their presence or coming to our knowledge—we had some reason to suspect the existence of stone, I hardly know how such stone could be removed, unless it should so happen that it lay in the rectum within reach of the hand. A brisk purge might be tried ; but if the stone happened to be large and heavy, this would not be likely to expel it. Strong acids would dissolve the stone out of the body ; but, in the strength in which one would dare to give them inwardly, they would certainly lose much, if not all of their power, by dilution and neutralisation, before they arrived at the calculus.

HARDENED MASSES OF DUNG have been known to collect within the colon, and block up the passage through it as effectually as though there had been a calculus ; which, purges and clysters, and every medicinal means that could be devised, have failed to remove. As was alluded to on a former occasion, Mr. King, of Stanmore, had a case of this kind. Nothing had passed through the horse for thirteen days ; and he had strong reason for believing that such was the nature of the stoppage. The animal's fate was sealed. Mr. King determined, as a last expedient, to make an open-

¹ Published in the 'Veterinarian' for 1852, vol. xxv, p. 177.

ing through the flank. He did so ; and, introducing his hand, found what he expected—hardened fæces collected ; which he squeezed and broke in pieces. The operation was followed by abundant discharges of dung. But relief had arrived too late : the animal already had sunk to a state of depression past recovery.

INTESTINAL WORMS.

Out of the many kinds of worms inhabiting various parts of the bodies of different animals,¹ we in general reckon four—though some writers mention a fifth—as claiming for their abode the intestines of the horse. Another description, named by Professor Joly, the *hypoderma equi*, inhabits the skin. For an account of it see ‘THE VETERINARIAN’ for December, 1850, vol. xxiii, p. 607. This account is carried to “Diseases of the Skin,” vol. i, of this work. That one animal should be destined to spend its life within the body of another, and be so completely dependent for its existence upon the one affording it a nidus that it can neither live out of its body nor survive its death, is one of those phenomena appearing to us like a freak of Nature, at the same time that, in a philosophical point of view, it turns out, on examination, quite beyond our comprehension. A fact even, perhaps, still more curious than this is, that the same variety of worm which inhabits the body of one species of animal will not live—at least, so we have a right to suppose from its never being found—within the body of an animal of another and different class : as with lice and fleas, so it seems to be with worms ; each kind having not only its appropriate *part* of the body as its nidus, but likewise its *particular* species of animal to infest.

ORIGIN.—Hurtrel d’Arboval has been at the pains to review some out of the divers hypotheses which have been framed

¹ Those found in the skin, in the eye, and other parts, shall be noticed in the disease of such structures. In an operation for castration, Mr. Cooper, V.S., Berkhamstead, discovered on laying open the cavity of the tunica vaginalis several worms floating about in the aqueous secretion contained therein.

in answer to the obscure questions—*how do worms get into the body?* or, *how are they bred there?* The ancients entertained notions that they were bred therein through corruption and putrefaction of various matters: such changes as these, however, we now know within a living body can never happen. A more reasonable hypothesis is, that numberless forms and kinds of worms are diffused throughout nature which only await time and place to develop themselves: this is comparing the worm to the bot, and without the support of any evidence to show that the former, like the latter, undergoes any transformation—that they ever exist in any other than the state of worm; or, indeed, have the power of existence at all out of the body. What also operates against this notion is, that worms have been seen in the sucking foal; nay, in the fœtus even. Linnæus imagined that both water and earth contained these forms. Some have conceived that animals might transfer worms from one to another through cohabitation. Velisnieri says, animals are *born* with worms, and that all have them; but that the development of them requires a concurrence of favorable circumstances. The worms found in fœtuses have been ascribed to hereditariness: in which case the parents must be shown to have some of the same kind; and, after that, a way must be discovered for them to get from one to the other.

The theory most in favour at the present day is that which ascribes to them spontaneous and unassisted generation; though this seems one hardly more susceptible of proof than some of the others. There are, however, some ingenious arguments advanced in support of it, such as, worms existing prior to birth; their incapability of living out of the body; their presence in different parts, even in parts the most profound and impenetrable; the animal's total unconsciousness of their presence; each animal having its particular sorts of worms; and the worms themselves differing in structure from any out of the body, and not being able to subsist on anything but digested alimentary matters and secretions. Now, as hydatids exist which are incapable, for

want of sexual organs, of propagation, is it an impossible thing for particles of matter to coalesce and form worms, and thus become animate, like as the hydatid does? Is it not in some such manner as this that the chyle nourishes and regenerates living fibre? To these questions, indeed, to the theory altogether, Hurtrel d'Arboval has made some plausible enough objections, for which I must refer my reader to his work, not having room for them here.

PRODUCTION.—Peculiar states of body—certain external circumstances—either conduce to, or else are consequent on, the presence of worms. Poverty of body appears to be favorable to their generation; the common notion being that the worms themselves reduce an animal's condition; though it is one that will, I believe, be found but in comparatively few cases to be true. Long residence on pasture in marshy or other wet grounds has been observed to be followed by worms. Stagnant water and miasms of various kinds have also been thought to give rise to them. It is certain that young animals are much more frequent subjects of worms than either adults or such as are declining in years; and that the more weakly and unthriving such animals appear, the more likely they are to be or become verminous. It is difficult to extract any principles, or even any plausible theory, out of these several commonly admitted facts. Hurtrel d'Arboval imagines that the development of worms is connected with an excited or irritated condition of the alimentary passages—a condition in which their mucous secretion is augmented; one, he says, remarkable enough, consequent on or connected with those states of general debility so frequently accompanied by worms. He cannot pretend to say whether the redundancy of mucous secretion be the cause of their production, or whether it may not be owing to their presence and irritation; but he feels himself warranted in asserting that their presence is always announced by signs of “sur-excitation” of the mucous membrane itself.

PROPAGATION AND DEVELOPMENT.—Intestinal worms, we learn from Rosen, are all oviparous; but there are, fortu-

nately, many obstacles in the way of all their eggs hatching; for if such did not exist, the animal would probably be "eaten up" by worms. For their germination, certain degrees of heat and repose become absolutely necessary; and both these, in particular the last, the ova are not always in situations to receive; besides which, many of them are carried away with the excrement, and expelled *per anum*; in addition to others, which, from various causes—morbid secretions, gases, deleterious matters in the aliment, &c.—turn out to be rotten. Once hatched, the intestinal worm grows the same as other worms, deriving its aliment by suction from the animal liquids and solids, and such secretions as seem especially adapted for its support. From the circumstance of their dying at the time the animal containing them dies, it would seem as if they did not and could not subsist upon the mere alimentary matters in the intestines; or else, that they died from loss of that genial warmth, together with the nutriment, furnished by vitality. Instances have been known of their becoming numerous enough to cause the destruction of the animal they inhabited; but such cases are very rare. In the opinion of Hurtrel d'Arboval, in all animals they do more or less harm. Their end may be, expulsion from the body alive, or they may die, and afterwards become voided, and still entire and perfect: though, should they remain in the bowels any length of time after death, they would undergo change and decomposition, and be voided as what is vulgarly called corruption.

The SYMPTOMS assigned to the presence of worms are so numerous that one would think there could be no difficulty in pronouncing upon them; and yet, after all, how stands the matter of fact? Why, that in no one, nor even in all of them together, can we place such implicit evidence as is furnished by the actual expulsion of one or more of the worms themselves, along with the fæces. Those enumerated by different authors are,—expressions, more or less violent, of colicky pains; attended with unusual whisking about of the tail; tenesmus; and frequent discharge, *per anum*, of mucus, or else of dung, enveloped in glairy mucous matter;

an oscillatory motion of the tail, even when no colic is present; and, owing to the continual itching about the anus, a disposition to rub the root of the tail or the rump against anything within reach; the appearance of exsiccated matter, in the form of a white or else a yellow powder, about the fundament; the horse licking the white-washed wall, and nibbling the manger, and even parts of his own body as well; eating any earth or clay or chalk he can get at, and being, as it is said, fond of salt in particular; raising his upper lip and rubbing it against the wall; his coat being dry and rough, and remaining on in patches long after it ought to have been shed; his skin tight and bound; lean in condition, and unable to be got to thrive: added to which, there is a feverishness about him; his pulse is small and accelerated; his mouth unusually dry and warm; and his appetite fastidious, as well as vitious. After all this detail, however, as I said before, I should advise that practitioner who sets a value on the correctness of his judgment, to give but a dubious opinion until such time as a worm, or some fragment or evidence of one, shall appear in the fæces.

KINDS.—Of the genus of worm called *ascaris* there are many species. Rudolphi reckons seventy-eight: of them, two inhabit the intestines of horses; viz. the *ascaris lumbricoides*, and the *ascaris vermicularis*. There has been also found, on rare occasions, the *strongylus*, and the *tænia*; and some¹ say, the *fasciola*.

The ASCARIS LUMBRICOIDES, or *lumbricus teres*, is the long round worm we most frequently discover in the dung of horses living in stables. In form it much resembles the common earth-worm, being cylindrical, about as large round as a woman's little finger, and in length varying from three to four inches to a foot. Two years ago I had one brought me that measured thirteen inches in length and one inch around its middle: another, the same year, that measured ten inches in length. Gibson says he has seen them "about eighteen inches long," and "larger than a man's finger."

August 24th, 1843, G 31, while at the forge, voided one

¹ Chabert and Girard both testify to having seen fasciolæ in horses.

thirteen inches long, but not above half an inch around the middle; and on the 10th of December following, the same horse, (G 31) now four years old, passed a worm of the same kind, measuring twenty-seven inches in length, having, in the course of the same week, voided 150, varying from six to eighteen inches long, of the same family. The worm is largest around its middle, from which it tapers off regularly towards either extremity, becoming at both ends pointed. In general, they are white; sometimes they have a red cast. It mostly happens that a single worm is passed, which would incline us to believe they were *solitary* within the bowels; however this may be, we know, occasionally, they have been found not only congregated, but in vast numbers together. Chabert tells us he found fourteen pounds (French) of them within a horse's small intestines! Their usual place of residence is the small guts; though I have discovered them coiled up together into a sort of ball within the stomach—at the same time that bots were clinging to its vascular part: rarely are any discovered within the large intestines. Be where they may, they are enveloped in mucus: seeming as if they preferred those situations in which that secretion was most abundant. Hurtrel d'Arboval has observed, that in the places where they are lodged in any numbers, the mucous membrane is wrinkled and reddened; sometimes he has found it exulcerated, and covered with a sort of fungus: all which he adduces as evidence of what he endeavours to prove is of the nature of an accompanying gastro-enteritis. In the spring of the year I have seen these worms full of young ones, looking like tangles of white or yellowish-white thread, within them.

The *ASCARIS VERMICULARIS*.—*ascarides*, commonly so called—is the small, needle-like, lively worm we occasionally find in vast numbers within the large intestines; and particularly within the blind pouch of the cæcum. The worm is commonly semi-transparent, or, when dead, opaque white—though, I have found a black variety, from half to one inch in length; and is at one end obtuse, which is the head of the worm; at the other, sharp-pointed, which is its tail. It is

an exceedingly lively and agile little creature—in liquid of any kind coiling and frisking about after the manner of an eel. On occasions it is detected making its escape from the anus. It appears to be the most destructive species of worm the horse harbours. I have heard and read of several instances of its pernicious operations: two or three I have myself witnessed. One I will relate here:

My father possessed a horse between four and five years old, that never looked well, and yet he did his work, and was a voracious feeder. In October 1829, being at the time conditioning for hunting, instead of gaining he gradually lost flesh, although in other respects he seemed healthy, and was sleek in his coat, and undepressed in spirits, while his pulse and breathing were normal, and he fed well. One thing appeared remarkable—that ever since he had taken to lose flesh *he had not lain down*. Added to which, latterly, his appetite failed; and he was observed to be continually licking and nibbling the rack and manger, as well as his legs, shoulders, and body: a propensity which had become so strong that nothing we could do would conquer it. Being now reduced to the lowest ebb of emaciation, he was destroyed. The villous lining of the colon, and cæcum and its appendix, exhibited a dark-red colour, indicative of approaching mortification. Its surface was covered pretty uniformly with clusters of ascarides. There was no ulceration or abrasion. The inflammation seemed to be the result of the constant irritation of the worms. I had a case, some short time ago, of the kind, in which the intestines were similarly affected. In both instances I regarded intestinal disease to be the cause of death.

The *STRONGYLUS* is very apt to be mistaken for, or confounded with the *ascaris*: I begin to think I must have committed this mistake myself, or probably should have noticed it earlier than I did. It is a slender worm, from two to four inches in length, in size similar to the red or blood worm used by anglers, and consists of two distinct portions:—a body, constituting not quite one-half of its entire length, rather smaller than a crow-quill; to which is ap-

pended a contracted thread-like pointed part, which is the tail, making up the remainder of its length. When first voided, the body appears black; the tail, and at times the head too, transparent; to the naked eye they have a sort of pied or black and white aspect; but through the microscope, their bodies appear beautifully striped and spotted; their head somewhat smaller than the body, out of which projects a sort of proboscis or horn; while the eye and mouth both of them appear to be very small. No sooner are they taken out of the dung than they vomit up their black contents, which has the appearance of so much black ink; and then their heads and bodies, like their tails, become pellucid. In those I examined, this ejection seemed to be their last act of life, for they never moved afterwards, but gradually shrunk and dried up to almost nothing. Numbers of them were voided by a young horse under the operation of physic, who had given us no reason to believe he harboured worms of any sort. Girard, fils, mentions a case of paralysis, in which, after death, he accidentally discovered two strongyli within the pharynx and œsophagus, and two others within the stomach.¹ In the case of a horse (H 20) six years old, who had been admitted for the purpose of watching the effect of the Butea (*trondosa*) given as directed by Mr. Western, very many lumbricoid worms were brought away from him by the operation of the physic with which the fourth dose of the Butea seeds were combined, with a considerable number of the strangylus worms as well, which latter had not been observed before: he only being complained of for having the long *white* or lumbricoid worms.

The TÆNIA, or *tape worm*, used to be designated by the French surgeons, *ver solitaire*, from a notion they entertained that never more than one was found: of late, however, our neighbours appear to have ample reason to change their opinions; since Chabert has reckoned 227 tape worms in a dog; 91 in a horse; 19 in an ox; and 12 in a sheep. The singularity of this worm, both in its appearance and structure, is too striking to be once seen without ever afterwards

¹ Article "Paralysie." (' Dict. Vet. de Aborval, edit. ii.)

being immediately recognised. It is white, flat, thin and broad, and tape-like in its shape, and of extreme length, divided at regular intervals by articulations or short joints. It is said to have measured twenty feet and upwards in length. It inhabits the small intestines, occupying from its great length a very considerable extent of their canal. The head, which is tuberculous and placed at the slenderest end of the body, is said to be always directed towards—now and then indeed to be actually within—the stomach. Tape-worms are frequently found in, occasionally are vomited up by, dogs: but in horses their presence is extremely rare: only one instance is recorded in the Sick Journals of the Royal Horse Infirmary. I never met with the worm in my own practice.

REMEDIES FOR WORMS are numerous enough, and so various that we shall find a difficulty in choosing; and a still greater difficulty in selecting one of any real service. In England we have for a long while been in the habit of pursuing the plan of treatment laid down by Gibson—indeed, many still continue the practice—of giving what are called *mercurial purges*; i. e., of exhibiting one or two drachms of calomel one morning, and the next, administering a strong purging ball, with a view of bringing away in its operation the worms which the mercury is supposed either to have destroyed or else detached from their holding places: or, the calomel and the aloes are sometimes mixed together in the same ball, in the proportion of one drachm to six or seven of purging mass. Gibson recommends “a course of these mercurial purges;” and directs us to follow them up with the administration twice or thrice a week of a drink composed of rue and chamomile and horehound, &c.

ANTIMONY.—The same author informs us that “most of the preparations of antimony are efficacious for destroying worms.” And this is a hint upon which we of more modern times have also acted. Many practitioners—myself for one—often prescribe tartar emetic with the intention of destroying worms. I will not aver that it has such an effect; but will honestly confess I, for my own part, have used the remedy rather from repute than any conviction of

its efficacy. I have commonly given drachm doses of it for several days together, and then administered a full dose of physic.

FRENCH REMEDIES.—Chabert, who has experimented by plunging worms of various kinds, taken out of the body alive, into different medicaments, has come to the conclusion that nothing destroys them so speedily and effectually as the animal oil of Dippel, which he calls *empyreumatic oil*; next to this, he ranks *winter savoury*, an infusion of which he used by way of a vehicle for the oil. He exhibited this combination of his two most powerful vermifuges to animals who manifested signs of worms: it did not in all bring away worms; but he concluded, nevertheless, that it had destroyed them, from the circumstance of the animals from that period recovering their health and *embonpoint*. The dose of the oil is from half an ounce to one or two ounces, according to the age and strength of the patient: and this is given every day on an empty stomach.

A NEW VIEW OF THE TREATMENT.—Hurtrel d'Arboval, with some reason, remarks, that those who have written treatises on, and presented us with remedies for, worms, have—Chabert among the rest—neglected to notice *the condition of the passages* co-existent with the worms, and on which their presence, for aught they knew, might depend. To complete the pathology of the case, this undoubtedly ought to be taken into the account. For, should there be reasons for supposing that the worms, by long and constant irritation, had created much or extensive inflammation of the mucous membrane of the intestines, it would certainly become a question, whether we should be warranted in giving anthelmintics at all; or, at all events, such of them as were of a nature in the least stimulant or irritative. Aloes, in an especial degree, and also calomel and antimony, and even castor oil, would become, in this point of view, inadmissible. What, then, is to be done? D'Arboval sagaciously recommends that we should look to the apparent origin or *cause* of the worms, and see if we cannot, by adopting another mode of living, feeding, &c., enable Nature herself

to get rid of her enemies; and, at the same time, by an appropriate diet, by soothing drinks, gruel, linseed tea, &c., followed up by bitter tonic drinks, rid the intestinal membrane of its inflammatory irritation, and afterwards restore its healthy condition. Which done, we may, if necessary, have recourse to our anthelmintics. These "ideas," which D'Arboval modestly submits to our consideration, *sous la forme dubitative*, are well worthy of our attention. Hitherto, as we all indeed know, little enough has been effected by medicine in this department: these novel views may possibly lead to the accomplishment of something more satisfactory.

My present treatment for the ascarides and strongyli consists principally in the administration of enemata: one of the most efficacious I find to be the

Terebinthinate Enema, which, for horses, I compound as follows:—

R Ol. Terebinthinæ, ℥vj;
Vitelli ovi, ℥j;
Decoct. Avenæ, Ovj.

Tere Terebinth. c. Vitello donec bene incorporantur deinde adde paulatim decoctum.

This injection may be repeated at the end of a few days, or continued twice or thrice a week, the interval being occupied in giving smart doses of cathartics. An unexpected occurrence followed the exhibition of a clyster of this description. The horse had had a free discharge after the clyster upon some granite pavement (in Nuedton shoeing-yard), and a little while after Mr. C. Sturt came to me in the surgery to observe, how what the horse had voided had brought the earth-worms out of the ground, through the interspaces of the pavement. There were above a dozen good sized worms crawling about in the liquid dung (and some ascaris with them), which former, though lively at first, appeared soon much less so, and to have lost all power of entering the earth again, and in about two hours were found dead.

Should the terebinthinate enema not prove effectual, I

would without hesitation have recourse to an injection of the Infusum Tabaci, for the formation for which turn to page 323.

SEEDS OF THE FRONDOSA—an Indian plant has recently been brought under my notice by Mr. Western, V.S., Madras Horse Artillery, as a potent anthelmintic, in doses of ʒij. for three successive days, and a fourth like dose on the fourth morning, in combination with a dose of physic.

DIARRHŒA.

DIARRHŒA AND DYSENTERY are the technical and special appellations for what we commonly call *looseness*, *purging*, *scouring*, &c., meaning thereby a frequent discharge of liquid excrement, which in the worst cases is dark-coloured and offensive. The former, the mild kind of disorder, may exist either as an

IDIOPATHIC or a SYMPTOMATIC AFFECTION: i. e., the purging may be either a spontaneous effort of the intestines themselves to throw out something proving obnoxious to them, or it may be the effect of hurried action of the canal, or of a degree of relaxation in its tone; or else the diarrhœa may be dependent upon a morbid or inflammatory condition of the intestinal canal, or of some organ immediately connected with it.

Any kind of food or water, or any medicinal substance which proves offensive or irritative to the mucous lining of the intestines, is likely to be productive of purgation; which, in the first instance, is nothing more than an effort of Nature to get rid of the offender. Green food of all sorts, as well from the water it has in its composition as from its acidulous properties, has this tendency; the horse is said to be “soiled” by it, and in consequence—according to the groom’s notion—to be cleansed of all that is impure and “humoury” in his blood: an old-fashioned doctrine, in which there is a great deal of practical truth, though it be somewhat “humorously” expressed. This “green doctor,” a vulgar appellation such green regimen sometimes goes by, may be pursued to an injurious extent. Cold, wet, rank

pastures are, by long continuance in them, exceeding apt to generate diarrhœa ; and this of such a nature as is very likely, in the end, to run into the worst form of this disease, or what is called *dysentery*. Even simple water, given at an improper time and in an improper quantity, will be productive of purgation, which may run into a diarrhœa. Every traveller knows, that if his horse gets a pailful of water before he starts on his journey, or while on the road, it will be likely, after exertion, to throw the animal into a profuse sweat, and set him violently purging. Independently of which, there are waters possessing peculiar properties or impregnations, such as take a peculiar or *diarrhœal* effect on the bowels.

As for medicinal substances, there are many that will excite purgation simply on the principle of causing irritation ; but there are some few which have this property resident in some peculiarity of composition : these we denominate *purges*, of which one of our most potent and efficacious ones is aloes. There was a time when the veterinarian was indebted to the groom and the horse-dealer for most of his cases of diarrhœa—when from one to two ounces of aloes, and calomel besides, were given indiscriminately to young horses, on their arrival out of the country. Such practices, however, are in a great measure discontinued ; and for humanity's sake, it is a fortunate thing they are, as the consequent super-purgation was occasionally attended with such intense inflammation of the mucous membrane that the death of the animal became an almost inevitable sequel. Even blue vitriol, which we regard as a tonic, will very often, in large continued doses, give rise to purgation. Indeed, this is by no means an uncommon effect of any medicament, when once it is carried to a harmful or poisonous extent. The horse is seized with griping pains ; gurglings are heard in his inside ; and he continues to express painful uneasiness, until, on a sudden, a copious emission of liquid dung and flatulence bursts from him, when he becomes as suddenly relieved, and remains so for a short interval ; when his gurglings and pains become renewed, and end, the same as before, in alvine and flatulent discharge, and an interval

again of ease. The early discharges consist almost entirely of liquid dung: those that succeed are frequently intermingled with mucous and gelatinous secretions from the lining membrane of the bowels. The emissions also vary in colour; and in some cases, though not usually, have an offensive fœtor.

INCREASED PERISTALTIC ACTION will, by hurrying the alimentary matters through the intestinal canal while yet in a state of fluidity, likewise induce purgation; and especially, as I noticed before, in a body in which these matters have already become reduced to copious liquidity by a large ingurgitation of water. And this is an effect more easily producible on a certain kind or make of horse—a make we vulgarly call *washy*—than on one of a different conformation. These washy (watery?) horses are, in general, found to be loosely made, slack in their loins, hollow-backed, high-hipped, and pot-bellied; and very commonly are of a light chestnut or bright bay colour, with white legs. There seems to be a want of brace or tenacity of fibre in such horses, in their inward as well as in their outward parts; which, added to a peculiar nervousness and irritability they in general evince, will serve in a great measure to account for their liability to diarrhœa—at least from the causes just mentioned.

A CONGESTED OR AN INFLAMMATORY STATE OF MUCOUS MEMBRANE may exist in company with, or in consequence of, some of the causes already particularised; or it may arise independently of them. Irritations of all kinds will naturally tend to the production of inflammation in it; or the same may be caused by wet or cold applied to the skin, by suppressed perspiration, metastasis, &c. I have known a horse to be attacked with diarrhœa after travelling by railway during very cold weather, he having been known to have sweated much (from agitation) during his journey, and then to have been suffered to grow dry of himself. This was the case with the four-year-old mare Captain Lowther bought for the regiment, and sent up per railway. In fact, whatever tends to throw the current of blood upon the bowels,

and thereby to augment their serous or watery secretions, may be considered as a cause of *diarrhœa* of a *serous* character.

Inflammation, however, may rapidly seize the membrane, and increase to that degree that its serous secretion, instead of being augmented, may become diminished or even altogether arrested; and there be effused in its stead flakes or strings of coagulable lymph, which, along with the mucus issuing from the follicles of the membrane, clings to and envelopes the dung-balls; and, in consequence, they come away enveloped in those glairy gelatinous coatings farriers and grooms so familiarly recognise under the appellation of *molten grease*. Over-working, or “over-marking,” as it is called, is a common cause of this inflammatory condition of membrane, one which often creates a great deal of constitutional irritation, so much on some occasions as to end in death: though a frequent and natural result of it is *diarrhœa*, which appears to be the most favorable turn the disease can take. It not unfrequently happens that the mucous follicles participate in the inflammation—though they may be excited to increased secretion only; in which case ulceration of those parts is very likely to follow, and thus becomes laid the foundation for a painful and troublesome form of *diarrhœa*, or rather, I would say, for a *dysentery*. At other times the inflammation pursues a more directly destructive course, and speedily ends in mortification of the membrane and death of the patient.

DISORDERED STATES OF THE LIVER, MESENTERIC GLANDS, &c., may give rise to *diarrhœa*, either from the irritation caused by unhealthy secretions, or from functional connection, by sympathy. Green-meat, especially the spring and late autumnal productions, appear to have considerable effect in augmenting the secretion of bile, and thus to give rise to a sort of *bilious diarrhœa*: new hay likewise has the same tendency. Of the pancreatic juice, and its uses, we know so little, that we are without the power of pathologising on this part of our subject. But in respect to the mesenteric glands, as we shall learn hereafter, *diarrhœa* is

one of the symptoms by which we are led to suspect the presence of disease in those bodies.

The case of H 17, in the "Record" Book, is an excellent one to show how obstinate diarrhœa may be successfully treated.

EPIDEMIC, BUT NOT CONTAGIOUS.—Many horses in the same stable, fed and worked and otherwise treated alike, may have diarrhœa at the same time, without there existing any reason to believe the disease to be contagious: the cause or causes producing it in one being such as to give rise to it in all of them; and the cure consisting in all in removing them from that situation, or changing their food or water, or whatever appears to have originated the disease among them. These remarks equally apply to dysentery.

THE TREATMENT OF DIARRHŒA must be framed and conducted in accordance with the causes to which it owes its origin, and perhaps continuance, and also with reference to the state of the intestinal membrane, together with the condition of its own secretions, as well as of those which it receives from other parts. Many—I might say, most—of the cases of diarrhœa which come under the veterinarian's notice, require no *medical* treatment at all. The good the practitioner does in such cases is to stay the hand of ignorance and presumption from doing harm. It is incalculable what mischief has been done on such occasions by the early exhibition of chalk and opium, and other astringents which, by checking this sanative effort of Nature, has converted a simple flux into an enteritis, and in that manner caused the destruction of the patient. Whenever we find the purging to be the effect of food disturbing the natural action of the bowels, or of water possessing some obnoxious property, we ought to view the flux as Nature's effort to get rid of the offending matters, and so, as her own mode of bringing about a cessation of the diarrhœa; and all that art can or ought to attempt to do, is, to assist Nature in this her process of cure. Instead, therefore, of checking, our duty is to encourage the diarrhœa, by giving the horse gruel and linseed tea, and sago, and even arrow-

root (should it not be found too expensive), and other mucilaginous drinks, which, while they augment and dilute the discharges, serve, by their emollient qualities, to soothe the mucous membrane, and protect it from the acrimony and irritation of the obnoxious matters. This constitutes the grand principle of treatment of diarrhœa of this class: at the same time it is a consideration which ought never, in fluxes of any description, to be disregarded; seeing that a great deal of harm is likely to be done by acting, without great caution and discrimination, on a contrary principle. Remember, this soothing will avail nothing without, however, change of diet, should the food be in fault, or change of water, should that have done the mischief; and in making this change we should endeavour to substitute an *astringent* diet for the one of a laxative nature. Warm clothing and dry comfortable stabling are useful adjuncts: not merely should we be desirous to divert the blood to the skin and extremities, but by warmth and dressing, likewise to restore to the skin its natural exudation, smoothness, and polish. In a case where such simple means prove insufficient, and there be evident signs of fever, do not hesitate to draw blood to the amount of a gallon in a full subject—less, in a washy or weakly one; which step may be followed up once afterwards, provided benefit arise from it. A stimulant over the surface of the belly ordinarily turns out an excellent sequence to the bloodletting. The turpentine liniment is made as under:—

R Liquor Ammoniaë,

Ol. Olivæ, āā ℥iv;

Misce bene simul et adde, secundum artem,

Saponis Mollis, ℥ij;

Ol. Terebinthinæ, ℥iv.

Our Pharmacopœia does not furnish an expellent medicine well calculated for recent and acute diarrhœa. Did we possess any medicament that could be trusted to act mildly and safely, as castor oil does on a man, or the same as magnesia and manna and rhubarb do, we would gladly in such a case

as this have recourse to them. Aloes is much too coarse and drastic and griping a purge to introduce; and as for sweet or common olive oil—which I know some would give in pint doses and upwards—for my own part, I deem it of very little efficacy. Should the patient be annoyed by fits of colicky pains, there will be no objection to exhibiting small doses of laudanum—from half an ounce to an ounce—in a quart of warm gruel or linseed tea, and to repeating them twice or thrice a day. Starch clysters may also be occasionally administered, either with or without laudanum in them, to relieve any symptoms of tenesmus or irritation in the rectum or colon. Not until other means have failed, and we have dispersed the inflammatory characters of the case, should we venture on *astringents*. One of the best and safest is the compound chalk powder of the *London Pharmacopœia*: this aromatic, soothing, binding preparation, may be administered either in ball, with syrup or mucilage, or in drink with gruel, or starch, or linseed infusion. In case it is required to increase the narcotic effect of the powder, either opium in substance, or laudanum, may be added to the ball or drench. Should the evacuations exhibit a bilious character, or there appear any reason for supposing the liver to be faulty in its duties, an excellent corrective will be found in the *hydrargyrus cum cretâ*: from half to an ounce of it mixed up with syrup into a ball may be given once or twice a day for a week, or even a fortnight, if deemed requisite. With this, Pulv. Ipecacuanhæ may be combined with great service, when the mucous lining of the intestine is deemed disordered as well. Should we be compelled to have recourse to direct astringents, one of the best is catechu, in ʒij doses, made up with starch and gum into a ball.

DYSENTERY.

By dysentery is implied the *flux* in its worst form, or, in the specific form in which it has been called the *bloody flux*. As in diarrhœa, the evacuations are both liquid and frequent;

but in dysentery they possess the additional characteristics of being totally altered from their natural appearance and odour: being dark-coloured, disgustingly fetid, purulent, and at times bloody, and on occasions more like coffee-grounds in aspect than matters of ordure.

The ESPECIAL SEAT of dysentery is the *cæcum* and *colon*: and

ITS NATURE—as far as my experience in so uncommon a disease will permit me to speak—essentially consists in abscess and ulceration of the mucous follicles of the membrane lining those intestines. The morbid appearances I have observed are—a jagged sort of exulceration of this membrane, covered with a brownish or dirty fetid purulent matter, and here and there small abscesses, which to me looked like so many distended follicles. In regard to the sound parts of the membrane, which itself is in a state of thickening, in one case I found them flushed from inflammation; in another, their surfaces exhibited a leaden hue, and were bloodless. I have, however, seen dysenteric intestines black and gangrenous—so rotten in texture that they would not bear removing without rupture; and in a state of distension from gas so disgustingly fetid that it was next to impossible to hold one's head over the gut the moment it was opened. Arsenic produces this state.

The SYMPTOMS characteristic of this condition of bowel, are—frequent evacuations of an offensiveness and an unnatural colour, consisting of lumps or pieces of solid matter floating in a fluid, which I have on occasions compared to coffee-grounds, accompanied by purulent, at times even by bloody, discharges; tenesmus: the animal lies much, unless when he is annoyed with griping pains, though these seldom come on until late; he falls away from day to day, notwithstanding that his appetite, though perhaps impaired, is by no means so very much to be complained of; his thirst is constant and insatiable; a slow fever attends, the pulse being about 60; fits of choleric supervene, or should they be already present, towards the latter stage they grow more painful, and

in one of these fits, the animal, harassed and exhausted by continual irritation and ejection of aliment, expires.

The CAUSE—the ordinary one—of dysentery, is long sojourn in low, wet, marshy pastures. I have already shewn that such situations cause worms to be bred or produced in the body; I have also remarked that lousiness is a frequent concomitant of poverty and hide-bound, states consequent on the emaciation occasioned by dysentery. I once received a horse from Plumstead Marshes to treat, who was dysenteric, verminous, hide-bound, and lousy, and withal, in a state of great debility. Other causes, however, may produce the disease. A diarrhœa, grown chronic and of long continuance, may terminate in dysentery. Food of bad quality; water of a noxious kind; exposure to sudden changes even, in horses of weak fibre and irritable bowels, may tend to its production. In situations where any of these causes are prevalent, diarrhœa or dysentery may arise and assume the appearance of infectious or contagious diseases; but—to repeat what I said before—they, neither of them, are in anywise communicable from one horse to another, in the manner that dysentery is said to be from one man to another.

TREATMENT.—The rarity of these cases, together with the little notice they have received, as distinct from diarrhœa, will account for the little we are able to derive from experience in regard to their management. Were there any signs of inflammation in the bowels—any manifestations of pain or even of uneasiness in them—providing the condition and strength of the animal admitted of it, I would bleed; but not to a large amount—say three or four quarts. Clichy, a French veterinarian, recommends the application of cupping-glasses to the anus: the comparatively small quantity of blood, however, known to be capable of being thus abstracted, together with the distance between the anus and colon, are circumstances which must render such practice, I should imagine, next to nugatory. The next thing to be done is to clear out the bowels; and the only medicine we have for this purpose is aloes, which—though on some accounts objectionable—appears to be demanded to accomplish so desir-

able an object in the treatment. Its operation may be encouraged by clysters. A stimulant to the surface of the belly will prove beneficial. The skin should be kept warmly clothed; the legs bandaged with flannel; and a dry and comfortable loose box be provided for the patient. His food—after the working off of the physic—may consist of the best hay and oats, with a proportion of old beans; the latter being a mild and nutritive astringent. His drink ought to be gruel; or else linseed or hay tea. Should the bleeding, and purging, and stimulating, fail to alter the nature of the discharges or at all check them, we may try the effect of mercurials, in alterative doses. I have given with great advantage from one to two drachms of *hydrargyrus cum cretâ* in combination with half the quantity of ipecacuanha or Dover's powder, twice a day, followed up by an occasional clear-out of the bowels. Should neither the antiphlogistic nor the alterative plan of treatment succeed, but the flux be found still to continue, and in such a manner as to produce debility and all its evil consequences, we must have immediate recourse to stringent medicines and opiates. The compound chalk powder, in the doses recommended for diarrhœa, may be first tried, with, should it be required, an aromatic or opiate confection: in the event of this failing, I know not to what one can have recourse—save it be to the Pulv. Cretæ, Comp. c. Opio, with more opium added to it, or else to catechu.

HERNIA.

HERNIA signifies a tumour in any part of the body, whose existence is owing to the protrusion of some viscus, in part or entire, through an aperture, out of its natural cavity. The most usual form of hernia, is the one popularly called, in man especially, a *rupture*, which consists of some viscus, mostly intestine, which has slipped out of the cavity of the abdomen. But hernia may exist of any of the viscera of the thorax or pelvis, and take its distinctive name, either from this circumstance, either from the name of the viscus itself, or

else from the canal or aperture through which it has made its escape.

On the DIFFERENT KINDS OF HERNIA met with in veterinary practice, we may reckon, as distinct in their situation and pathological characters, four: others being either but extensions or modifications of these, and of comparatively rare occurrence.

1. INGUINAL HERNIA is intestine protruding through and forming a tumour within the inguinal canal; which, continuing its protrusion through the external and internal abdominal rings, and lodging within the scrotum, becomes *scrotal* hernia.

2. UMBILICAL HERNIA, intestine protruding through the navel or umbilicus and forming a swelling there which is so called.

3. VENTRAL HERNIA including all protrusions through any part of the parietes of the abdomen, in any *other situation or part*.

4. DIAPHRAGMATIC OR PHRENIC HERNIA is the name given whenever intestine or any other viscus happens to have found its way through the substance of the diaphragm: should it become lodged within the chest, it is now and then called *Thoracic Hernia*.

The PART PROTRUDED in hernia is, commonly, either the intestine or the omentum, or both. Every abdominal viscus, however—nay, even the thoracic and cerebral too—must be regarded as liable to become hernial. To a French veterinary surgeon, M. Sanitos, occurred the very singular case of *hernia of the bladder*. The horse had the usual symptoms of colic, and on examination was discovered, towards the inguinal ring, on the right side, a tumour as large as a man's fist, separated, as it were, from the scrotum, and hanging considerably below it; and so large did it become, that it required to be suspended by a bandage.

ANOTHER DIVISION OF HERNIA is into *reducible*, *irreducible*, and *strangulated*. When the contents of the tumour admit of being returned into the abdomen, the hernia is said to be a "reducible" one; but when, either in consequence of their bulkiness, or their adhesion to the sac containing

them, or to each other, that is found impracticable, the hernia becomes an "irreducible" one; should there be constriction at the mouth or contracted part of the sac—which in inguinal hernia is at the internal abdominal ring—to that degree that the circulation is either much impeded or altogether arrested, the hernia is said to be "strangulated."

The HERNIA THE MOST FREQUENT, as well as the most important, is inguinal: to which, on both these accounts, it will be necessary that we should give our fullest consideration. In doing this, we shall find, as we proceed, that many of our observations become equally applicable to the other descriptions of hernia: a circumstance that will enable me to curtail my account of these minor and less important species.

INGUINAL HERNIA.

The rarity of this hernia in our country has afforded British veterinarians but scanty opportunities for observation concerning it compared to those enjoyed by our Continental brethren, and this satisfactorily accounts for the absence of any work in our own language containing the required information on the subject: a circumstance that might be on occasions deplored were we not in possession of one in another tongue which supplies all we can possibly want or wish for; from whose valuable pages I shall take the liberty to transcribe herein so much as will prove really practical and useful to us. I need hardly add, I allude to the magnificent work of the distinguished French professor, Girard.¹

The custom in France, Germany, India, Arabia, and some other countries, of preserving horses entire, is the reason

¹ 'A Treatise on Inguinal Hernia in the Horse, and other Monodactyles,' by Girard, Director of the Royal Veterinary School at Alfort; Paris, 1827. This work was, in extracts, translated and commented on by me in 'The Veterinarian' for 1829. I have, in this new edition of my work, the satisfaction of adding, that in the year 1838 an excellent paper was read on the subject of 'Hernia,' before the Veterinary Medical Association, by Professor Simonds of the Royal Veterinary College.

obviously to be assigned for the prevalence of inguinal and scrotal hernia in them: while, on the other hand, the little we are troubled with the disease in our own land is a proof that the practice of castration operates as a pretty certain prophylactic against its occurrence. And when we do meet with the disease, it is not in geldings but in stone-horses, and particularly in such as have raced or been in training. This accounts for army practice seldom producing such cases; at the same time that it affords a strong argument for a thorough acquaintance with the subject on the part of the veterinarian whose sphere of practice is likely to embrace any racing or training establishments.

WHY MANY MORE MEN THAN HORSES BECOME RUPTURED Girard thus learnedly and satisfactorily explains:

Animals are much seldomer the subjects of hernia than men, not less on account of the horizontal position of their bodies than from the disposition of the muscles and fibrous envelopes forming the inferior parietes of the abdomen. In man, the intestinal mass is bearing downwards, and particularly upon the inguinal regions, where the openings—the abdominal ring and crural arch—are situated. In quadrupeds, on the contrary, in consequence of the oblique inclination, forwards and downwards, of the floor of the belly from the flank to the brisket, the intestinal mass gravitates against the diaphragm, pushing it forward and occasionally rupturing it. The resistance afforded by the parietes of the belly is likewise greater, owing to the increased density and peculiar disposition of the coverings of the abdomen, the *faschia superficialis* being thicker, more elastic, and more developed than in man, and particularly towards the pubes, and being supported by the *panniculus carnosus*, an envelope that does not exist in man; added to which—not to mention the advantages arising from the oblique and straight muscles, which latter are much broader than in man—the *faschia transversalis* is considerably stronger and more expanded. Connect with these facts the practice of castration at an early age, one consequence of which is the contraction of the inguinal canal, and there will appear sufficient to account for the comparative exemption of the horse from inguinal rupture, and at the same time for the unheard-of occurrence of the species denominated *femoral*.

Since the foregoing was written, such an “unheard-of” case has happened to M. Seon, Veterinary Surgeon to the *Garde Royal*. He was called, while on the march, to a mare with a swelling as large as his fist

in the upper and fore part of the inside of the thigh. The existence of hernia was evident beyond dispute. By compressing and pushing its contents backward and upward, he caused the whole of them to re-enter the canal, but they speedily re-appeared. Bandages and compresses of tow kept the hernia reduced, but their tightness caused alarming tumefactions which required their removal, and the consequence was on the sixth day the hernia returned. The mare was now cast, the hernia reduced, and pledgets of tow, dipped in melted pitch, plastered upon the situation of the tumour, and over them one, twelve inches in diameter, of pitched strong canvass. As soon as the pitch had set the mare was let up. In ten days afterwards the plasters had fallen off, leaving some ulcerations, which readily healed. The place opposite the termination of the femoral canal subsequently exhibited a species of callus.

The contents of Inguinal Hernia consist, almost in all cases, of the small intestines. From their looseness of attachment, their volume, their general inanity, and their energetic contractility, they the most readily enter the inguinal canal. The duplicatures and flexures of the colon are the parts next most liable to protrusion. In respect to the omentum—which is so short that one would conceive it impossible it could ever reach the canal, without laceration at least—its protrusion is uniformly the effect of some violent intestinal commotion, and is never the occasion of much mischief. When the contents are intestines solely, the hernia is denominated an *enterocele*; when nothing but omentum, *epiplocele*; when both combined, *entero-epiplocele*.

The ordinary Causes of inguinal hernia are inordinate peristaltic commotions, excited by colic. The rupture, however, may happen under the efforts occasioned by a heavy burthen, or in the acts of rearing, kicking, leaping, &c. To these causes—as practitioners in England—we may add those violent exertions the animal is forced to make in racing and hunting. The force with which the diaphragm recedes in the efforts made by the running animal to expand his chest—dilatation of the cavity laterally being much opposed by the confinement of the ribs by the girths—impels the viscera backwards against the abdominal rings, through which one or other of the small intestines—they being the loosest, smallest, and most glib parts—is very likely to be protruded. This accounts for our viewing horses that have been in severe training with great suspicion when they are brought to us for castration. In India, where hernia is very frequent, Mr. Molyneux—a gentleman who has written a very good paper on the subject in 'THE VETERINARIAN'—informs us that "exertion is the chief," and, he believes, "almost only cause;" though on one occasion he knew it "to be produced through constipation"—by "the exertion used in expelling the fæces."

HERNIA MAY ARISE FROM MECHANICAL INJURY: of this the following affords a good illustration. In 1820, Mr. C. Percivall went to see a black cart colt who had received a kick five days before from another at straw-yard. He found a large swelling along the posterior and inferior part of the belly, which was soft and yielding, as though it had been a bladder distended with air. He easily reduced it, and applied a compress and roller, bled, and gave some aloes. In three weeks, though considerably diminished in volume, the intestine was still very perceptible. "After this," adds Mr. Percivall, "I blistered the part, and certainly with good effect; though the scrotum ever afterwards remained hernial."

Stallions are the ordinary Subjects of this affection, especially those in the habit of covering. Geldings rarely show this hernia (owing probably to the contraction and partial obliteration of the apertures and passages through which it comes), and M. Girard has never seen it in a mare: one obvious reason for which exemption is the comparative narrowness of the abdominal ring in the female, the round ligament being inconsiderable in volume contrasted with the spermatic cord. The presence of the uterus and vagina, together with the greater elevation of the pelvis in the mare, will also serve to explain this—the bowels in her body being necessarily thrown still more forward against the diaphragm.

Notwithstanding these impediments, however, the occurrence is possible, as is satisfactorily shown by a case related in 'THE VETERINARIAN' for 1830, by Mr. Proctor.

Peculiarities.—This hernia may exist with or without visible tumour; and may either be *acute* or *chronic*, *simple* or *strangulated*, *continued* or *intermittent*. In some cases there exists thickening of the membranes, adhesion of the coverings of the hernia to one another, occasionally to the intestine within them. In other instances hernia is complicated with hydrocele, the tumour assuming another shape and acquiring considerable magnitude. Besides these differences, the hernia may be what is called *latent*, i. e., imperceptible, at least to the view, in consequence of having protruded no farther than the inguinal canal, in which state it is named BUBONOCELE: though when it pervades the canal and descends into the scrotum, it takes the appellation of OSCHEOCELE. Either of these forms may be *recent* or *inveterate*, *reducible* or *irreducible*. Hernia very rarely exists on *both* sides. It occurs oftenest on the *right*—a circumstance

M. Girard is unable to explain : may this not arise from horses in general being taught to put their right legs foremost, and consequently exert and strain their right sides more than their left ?

M. Girard enters into an account of each form of inguinal hernia by a classification of cases under the general heads of *Enterocoele* and *Epiplocele* ; and the specific ones of *recent* or *inguinal enterocoele* (properly so called), *enterocoele from castration*, *chronic* or *scrotal enterocoele*, and *congenital enterocoele*.

INGUINAL HERNIA—strictly so called, or BUBONOCELE—almost always makes its appearance abruptly, and hastens to become strangulated. Whenever it does happen that the descent is gradual, the gut remains for a time in concealment, nor do we become advertised of its descent until it has made farther progress or given rise to certain disorder. Until this change takes place in the hernia, it does not necessarily follow that the health is disturbed.

The Symptoms marking its presence are—indisposition to work, erected head, appetite impaired : pain succeeding, the animal breathes deeply, paws, and puts himself into various postures to obtain relief. There are cases in which the horse appears as if he were languishing from over-fatigue. A tumour is probably present in the groin, varying in magnitude and form, depending on the nature and quantity of its contents ; whether it be full of fæcal or gaseous matter, which may probably be detected by the feel. It is perhaps reducible, and readily returns into the abdomen ; but no sooner does the animal come to move again than the hernia re-appears, or even as soon as the pressure of the hand is taken off. The second descent becomes commonly followed by a third, and so on, until, from the volume it acquires, the hernia becomes permanent. Knowing the usual causes, it becomes our duty, while watching the symptoms, to make inquiries concerning them. At length the pulse becomes thready ; the eyes reddened ; the pupils dilated. Inflammation seizing the displaced parts, occasions slight colics, continued or intermittent. Both Mr. Hodgson and Mr. Molyneux (veterinary surgeons in the Company's Army) compare the symptoms to those of colic ; with this difference, adds Mr. Molyneux, "that there is no remission of pain." The testicle on the hernial side, though felt drawn up, irregularly descends and ascends : this symptom is highly pathognomonic, and one demanding that the practitioner should, without loss of time, examine into the state of the inguinal canal. In this—

Examination, or manipulation, both hands are employed ; one being introduced into the rectum, the other into the sheath. The one within

the rectum seeks the internal ring; while the other, pursuing the course of the cord on the side affected, is pushed up to the external ring; and thus, in the natural state, the opposed fingers may be made nearly to meet, and the dimensions and condition of the apertures ascertained. However small the protruded portion of gut, the operator will be able to detect the bubonocoele, and even to reduce it, by proceeding, *secundum artem*, with such necessary precautions as will be hereafter pointed out. This exploration may be conducted in the standing posture; though it will be prosecuted with more facility and certainty should the patient be cast, which, indeed, is by far the preferable mode of proceeding.

Should hernia be found, and not prove at once reducible, M. Girard recommends, to be practised in the following manner—

THE TAXIS.—The horse is to be thrown upon the unaffected side; and, with one hind leg drawn and fixed forward, in the same manner as for castration, he is to be turned upon his back, and maintained in that position by bundles of straw, with heaps of straw placed underneath him to raise the croup. With both arms well oiled, or smeared with some mucilaginous decoction, the operator will now commence his exploration, taking care to empty the rectum as he proceeds. Should he find that the gut passing through the ring is neither strictured nor strangulated, he may endeavour to disengage the hernial portion by gently drawing it within the cavity, at the same time aiding its retraction by pushing it inward, with the other hand within the sheath. Should he experience much difficulty in that attempt he is to desist; violence being often the forerunner of strangulation and gangrene. The practitioner must bear in mind, also, that although he has succeeded in the reduction, unless this be followed by castration, and that *immediate* protrusion is likely to recur, and may do so even the moment after the animal has risen. Mr. Molyneux recommends that the patient be blooded largely prior to being cast for the taxis, with a view of enfeebling the muscular energy; and, for my own part, I quite subscribe to his practice.

The Feel of the Tumour is soft, more or less voluminous and elastic, and (when the horse is coughed?) salient, or rebounding under the pressure of the fingers, or else it is substantial and weighty. It either fluctuates or pits, according as it contains gaseous or stercoral matters, the latter giving it at times a solid, irregular, lumpy feel. When the gut is so closely embraced around the neck of its peritoneal sheath that all passage through it is interrupted, the hernia is said to be—

Strangulated: an event also indicated by the rapid aggravation of all the symptoms. Sometimes it happens that the gut is merely nipped or

pinched at the ring, a swelling being thereby produced about the size of a nut; at other times, sufficient of the gut enters the inguinal canal to admit of the accumulation of matters, stercoral or gaseous, or both, and the consequences are, distension and gangrene.

The Symptoms of recent Strangulation are—aggravated colic, which ceases only with the supervention of gangrene; alternate ascent and descent of the testicle, at first in quick succession, afterwards at longer and longer intervals, until at last the organ continues drawn up—no longer perceptible below. Tortured with pain, the animal lies down and rolls upon his back, and maintains that position—appearing to derive from it temporary relief. While in the erect posture he quite writhes from suffering, and, with his fore feet fixed, crouches almost down to the ground. He breaks out into a profuse sweat; and in that state ends his agony, not by lying down and struggling, as in ordinary enteritic cases, but by falling at once prostrate, a lifeless carcass. In a case that occurred to M. Languenard, and another which happened to M. Girard himself, the spasms were attended by vomiting, and, in the former, also by rupture of the diaphragm.

HERNIA IMMEDIATELY FOLLOWING CASTRATION—what M. Girard calls *the hernia of castration*—is produced either by the violent struggles of the animal while under the operation, or else appears in the act of rising. In its effects it is essentially similar to the one already described.

SCROTAL HERNIA, or OSCHEOCELE, owes its production to dilatation of the vaginal sheath of the testicle, combined with relaxation of the fibrous tissue surrounding the ring, and is at first mostly intermittent; that is, it disappears during repose, and returns under exercise or exertion; which variable condition continues until such a descent takes place as renders the tumour, from its weight, incapable of yielding to the retraction of the surrounding parts: in this condition its augmentation goes on, until the matters accumulated within the gut produce obstruction, and that becomes followed by strangulation. These changes, so far from being sudden, proceed rather slowly; and accumulation and obstruction always precede strangulation. While the accumulation is going on, we may observe loathing of food, dulness, indisposition to move; also, as the engorgement proceeds, loss of appetite, constipation, borborygma, colic. Strangulation adds virulence to these symptoms, occasioning, as in recent hernia, the greatest distress, until gangrene takes place, and then all pain suddenly ceases, and cold sweats, shiverings, and convulsions, close the scene.

Strangulation.—Practical observations show us that old herniæ become strangulated from engorgement, and not from stricture around the neck of the sac at the ring: *that* can be considered but as a secondary cause

The circumstance of stricture following, however, accounts for the symptoms of strangulation being in these and the afore-mentioned cases essentially alike; being found to vary only in their succession and rapidity of progress. It may be observed, however, that many horses having scrotal hernia not only escape strangulation, but continue to do their work with a large tumour swinging between their thighs. Gibson mentions a case in which "the gut extended the scrotum down to the hock"; apparently, without any inconvenience from it beyond what may arise from its bulk and weight. This is a fact which argues most strongly against meddling with such tumours, unless we be peremptorily called on to interfere.

Diagnosis.—It is not always easy to distinguish scrotal enterocele from other swellings of the genitals, and particularly when the hernia is complicated with sarcocele or varicocele, or thickening of the cord, or a combination of these affections. The tumour of an enterocele does not preserve a general uniformity; it is commonly most bulky nearest to the abdomen, increasing from below upwards: indeed there are cases in which its volume below, little, if any, exceeds that of the scrotum. The swelling yields to pressure, and returns to its form after being compressed. If it be raised up with the hand, it sensibly diminishes in volume, from part of its contents being withdrawn into the abdomen: the retraction sometimes being attended with a gurgling noise. Should it be deemed advisable to examine into the state of the inguinal canal, its openings will be found to be more or less dilated and encumbered; and this is an infallible proof of the existence of hernia.

One Diagnostic more I would add, which seems to have escaped the observation of our learned author; and that is, the self-expansion of the swelling under the effort of coughing. Grasp the tumour with one or both hands, softly but closely, and then let another person cough the horse, and the swelling will be found suddenly to expand under the effort, and as quickly to recede again. Might not this criterion supersede the troublesome business of exploration *per rectum et vaginam penis*?

Morbid Consequences.—In almost all *chronic* herniæ we meet with serous effusion, either into the cavity of the tunica vaginalis, or into the cellular tissue uniting the hernial coverings. Morbid thickening of the tunics is a much rarer occurrence, and one of which M. Girard has seen but few examples. The comparative rarity of cases of adhesion

between the gut and sac in horses, Girard thinks, may be ascribed to the non-employment of artificial pressure, by trusses and bandages, as in man. Mr. Charles Percivall, however, informs me, that the occurrence is by no means so uncommon in India, where castration is much practised at a *late period of life*.

CONGENITAL HERNIA.—This, the most frequent but the least dangerous species of hernia, is an attendant on birth, augmenting up to the third or six month; after that diminishing, and ultimately disappearing. Should it continue, without lessening in volume, for a year or eighteen months, it may be considered as, and is in fact become, a *chronic* or permanent scrotal hernia. In case the swelling, however, instead of being always the same, at intervals diminishes, and continues so to do more sensibly as time advances, it will in the end recede altogether; for though it return again at times, still, the relapses growing less marked or frequent, at last the gut will be found to enter the ring no more.

In the Fetus in Utero inguinal hernia is present. M. Linguenard, V.S., who has practised for twenty years in Normandy, a great breeding country, has ascertained, by a vast number of observations, that *inguinal* hernia invariably exists at birth, even in abortions and in subjects still-born.

After Birth.—Herniæ making their appearance a few days after birth are also to be included in the class of “congenital.” In these cases the gut becomes hernial in the same manner in which it does in adult age: it slips through the peritoneal aperture at the ring, and either drags down the testicle along with it, or else follows that organ in its descent: the testicles in ordinary cases descending prior to the sixth or seventh month. The experienced practitioner above named, M. Linguenard, calculates that about one fourth of the Norman colts are foaled with *scrotal* hernia; but that in the majority of them it disappears in the course of growth. In the ‘Recueil de Médecine Vétérinaire’ for July, 1828, appears the following: “These swellings (scrotal herniæ) occasionally make their appearance in the scrotum of the colt a few days after birth. Sometimes they occupy one side only of the bag; occasionally both are distended. In a few instances the scrotum becomes as large as a child’s head: these are true scrotal herniæ. A portion of intestine has descended into the scrotum. Bandages and topical applications are perfectly useless, or worse—producing irritation and pain. At an uncertain period the swelling begins spontaneously to diminish, and at length entirely disappears. When it occupies both sides of the scrotum, it goes back more tardily; and the retraction of one side seems to be quite independent of that of the other.”

Causes.—It is worth while to inquire if the hernia which exists prior to birth, originate from causes similar to those that occasion it in after age. Certain movements of the full-grown fœtus appear very likely to produce hernia, especially at a time when the inguinal apertures and canals are so lax as almost to invite entry: indeed, both the ring and inguinal canal in the fœtus appear proportionably larger than in the adult, and evidently possess more extensibility. The parietal parts—the fibrous aponeurosis of the abdomen, the borders of the external ring, the dartos, and the cremaster—being all as yet but imperfectly developed, possess little power to oppose hernia. No sooner has the fœtus left the womb, however, than these several parts by degrees acquire strength, until they possess energy sufficient to react upon an incarcerated hernia, raise it upwards, and ultimately force it back again into the abdominal cavity, and retain it there. We may now also explain how it happens that these herniæ suffer no engorgement or strangulation until age is farther advanced; since then it is that the animal's food becomes of that fibrous substantial character which adds to the volume and weight of the hernia, and in the same ratio operates against its return, and tends to superinduce other more serious consequences.

EPIPLOCELE is a frequent companion of enterocoele, without adding anything to the importance of the case: indeed, epiplocele of itself is so far from being dangerous that it has occurred without inducing symptoms either of pain or disordered function. Protruded omentum, without intestine, gives rise simply to a soft indolent tumour in the groin, unvarying in volume, unless it receive addition to its contents: a circumstance that serves at once to distinguish it from enterocoele. I think I may add to this, *coughing*, as a corroborating diagnostic. M. Roupp assured M. Girard, that, in the course of the practice of castration on cart-horses, he had on several occasions met with hernial omentum, and had invariably amputated the protrusion, without the smallest ill consequences.

THE TREATMENT OF INGUINAL HERNIA must be based upon reduction through the release or return of the confined or incarcerated viscus. The veterinarian's first concern in these cases is his *diagnostic*; his next, the due appreciation and scientific employment of the different resources furnished him by his art for the removal of the disease. The case, however, may be incurable, or of such nature as would evince folly and temerity in surgical interference of any kind—at least, of such as we understand by an "operation."

While so recent that the tumour is yet only visible at certain times, and the animal's health remains undisturbed, nothing more is commonly done than bathing the animal in some river, or making use of astringent applications or injections. Unfortunately, veterinary surgery has not yet invented any sort of *truss* or suspensory bandage that can be worn. Sothysoll, indeed, says, at page 266, speaking of "a remedy for a rupture or *busteness*, that he knew a very industrious groom who invented a kind of truss for *busten* horses."

Reduction by the Taxis.—A manual operation for the return of the gut, the nature of which and mode of procedure have been already described at page 378, can only be practised with success so long as the ring remains in its natural condition, and while the hernia is recent, and there exists no stricture or impediment to the retraction of the intestine. In a case where the neck of the sac is become enlarged, the reduction, of course, will be readily effected; but it can prove only temporary, unless followed up by the operation of castration, the only means we possess of causing contraction or obliteration, more or less, of the canal. If, after a thorough examination of the parts, reduction by the taxis be considered practicable, no time ought to be lost. Only let the operator remember, that all force in drawing in the gut is to be avoided, otherwise the consequences may be—as they but too often have been—inflammation and gangrene, if not rupture.

AFTER THE OPERATION OF THE TAXIS should there appear any reason for apprehending a return of the hernia, either from the enlarged condition of the ring or previous habits of colic, M. Girard recommends keeping the animal cast upon his back for some time, to give the gut time to recover its proper place and position; and, after the horse has risen, to put him in a stable so prepared that his hind parts may stand elevated as much as possible above the fore; also to give him nought but straw and water gruel. He likewise recommends bloodletting, enemata, and fomentations to the belly. In one case, in which the gut had returned several times after reduction, M. Girard succeeded with the T bandage.

OPERATION FOR SCROTAL HERNIA IN STALLIONS.—This being the simplest form of operation with the knife, and many of the directions given for it being applicable to the others, our author speaks of it first.

Of these herniæ some are reducible by the taxis; others irreducible: their reduction, however, rarely proves but temporary, the operation of castration (*à testicule couvert*) being required to complete the cure. Furthermore, the hernia may be simple, or it may be complicated with hydrocele, sarcocele, varicocele, and adhesion.

Operation for simple Scrotal Hernia.—Providing there be no sarcocele, and the hernia be of the reducible kind, there will be no difficulty about the operation. The horse being cast and turned upon his back, the operator will seize the testicle with his left hand and draw it out as far as he can, while with the right he makes every effort to push the hernial viscus back, through the ring, taking care in so doing that he makes his compression *upon the sides* of the tumour. Should there seem to be any unusual obstacle, he may, by giving the testicle to an assistant, employ both hands in the manipulation. The croup ought to be elevated, that position being most favorable to the return of the hernia: indeed, when the gravitation of the viscera is in this manner taken off, it not unfrequently happens that the gut slips up of itself. On one occasion, the animal was no sooner turned upon his back than the hernial mass disappeared, drawing with it into the abdomen the testicle; which latter the operator sought afterwards in vain. The consequence was a necessity to allow the animal to rise again and walk about in order to produce afresh the hernia. This shows the expediency of seizing and retaining the testicle the moment the horse is cast. In some cases it will prove advantageous to draw out the scrotum, it being by compression apt to force the hernia against the ring. We must not have recourse—if we can anywise manage without it—to traction through the rectum, it being in this case dangerous, and likely to aggravate the disease. Enveloping the tumour in powdered ice, bleeding the patient to a large amount, and the tobacco enema, are measures of great efficacy, and such as must be had recourse to when minor ones fail of success. The hernia reduced, the operator proceeds to the operation of castration, *à testicule couvert*. In this procedure M. Girard sagaciously warns us to take great care in cutting through the scrotum and dartos, lest we open the hernial sac; at the same time to make the separation of the dartos from the sac as complete and clean as possible, in order to give the utmost effect to the clams, which ought to be fixed close to the ring. Before the clams be shut, let the operator assure himself that no skin—above all, no portion of intestine—be included within their gripe; for the latter circumstance did once happen to an experienced operator (M. Roupp), and gave rise to violent colics, which could not be relieved but by casting the animal a second time, and loosening and placing on afresh the clams. The testicle had better be taken off at the time the clams are applied; the clams then will be drawn up close to the belly, and may be left remaining on until they spontaneously lose their hold. On some occasions *curved* clams have been found preferable: their convexities being turned towards the ring, the apposition and pressure become both more efficacious.

Thickening of the Membranes will render the dissection of the dartos from the sac both tedious and difficult; and this may exist to that degree

—in one case they were found an inch in thickness—that for the clams we shall be compelled to substitute a strong waxed ligature for the compression of the cord, which must be fastened by a running knot.

In the case of Sarcocoele the operator must be guided by circumstances. Should the tumour consist of intestine principally, the operation is to be conducted the same as for thickened membranes. Sarcocoele may render the tumour so solid and compact as to deprive it of every sign or feel of containing intestine; and should the operator neglect to explore the ring, this concealment may lead him into fatal error, in case he might determine on the removal of the sarcocoele. Whenever intestine is detected, he must take care to make himself sure about its return before he ventures to apply either clams or ligature to the sarcocelatous swelling.

Adhesions between the hernial gut and its sac are so rare that M. Girard has seen but one instance of their occurrence; though it would appear, from what has been already stated on the authority of Mr. Charles Percivall, that between the testicle and its vaginal covering they are by no means uncommon. When adhesions of the first kind do occur, it becomes necessary to open the sac in order to destroy them, before the reduction can be accomplished: a case wherein the clams will have to be applied upon the bare cord.

In the cases of Stoppage and Strangulation herniotomy becomes necessary, and must be practised without delay; otherwise, scrotal hernia in general admits of time for deciding on the operation, and for preparation for it by dieting, bloodletting, &c.

After the Operation, the veterinarian will, besides enjoining a low and appropriate diet, bleed and purge and administer injections, according as the case may seem to require. The animal had better stand with his croup elevated, and be tied up so that he cannot lie down.

A CASE OF SCROTAL HERNIA OF EXTRAORDINARY MAGNITUDE is related by Mr. Marshall, V.S., Dungannon, in 'THE VETERINARIAN' for 1854 (p. 83). The subject of it was a stallion, and the hernia appeared to have had its origin in the act of covering, when one of his hind legs slipped into a ditch, for some time after which he "appeared rather dull." And "the swelling continued to increase in volume," and at this time "hangs nearly down to his hocks." It is on the left side. First warning the proprietor of the danger of the operation required, "I operated *à testicule couvert* on the affected side, the other testicle being removed in the ordinary way. I then inserted two strong metallic sutures above the clam, as close to the abdomen as possible. The

horse was now allowed to rise." "The after-treatment consisted in giving a dose of physic, scarifying the pendulous sheath, &c., and keeping the hind parts *raised* in the stable. The clam on the left side remained on until it sloughed off. The metallic sutures were not removed for a considerable time after. The horse perfectly recovered, and has been sold, with a scrotum of the ordinary size."

OPERATION FOR HERNIA IN GELDINGS.—That hernia is in geldings a disease of the rarest kind, the veterinary annals of our own country afford ample proof; still, the fact of there being cases on record is sufficient to show that one may offer to any one of ourselves, and perhaps at a moment when least of all expected: though taken by surprise, however, that we may not be taken unprepared as well, it behoves us to possess ourselves of every information requisite for the treating of such an accident.

The ABLATION OF THE TESTICLE is often followed by enlargement of the end of the spermatic cord, which contracts, cohesion with the scrotum, down to which tuberos (united) part the inguinal canal remains pervious, terminating there in a cul-de-sac. By degrees, in the course of time, the tuberosity of the cord diminishes; the cord itself withers and shrinks; its vessels contract, as well as the *vas deferens*, which latter is commonly found to contain a colourless glairy fluid. We learn from M. Girard, that—

In Geldings, inguinal hernia takes the same course, is susceptible of the same terminations, and requires the same treatment as in stallions. Trusses and bandages are all ineffectual: a surgical operation is the only means of causing contraction and closure of the inguinal canal. And this consists simply in the application of clamps—no cutting being required—upon the outside of the skin, the same as is practised for umbilical hernia.

The Taxis is to be employed, and will be conducted with most effect—the horse lying upon his side—by drawing out the hernial sheath with one hand, while the other is employed in manipulation. Should this mode fail, an assistant may be directed to grasp the hernial mass, and keep it from pressing against the ring, while the operator renews his efforts to manipulate it upward. In some cases it becomes necessary to have one hand within the rectum.

The Clams ought to be applied immediately after the reduction of the hernia. In putting them on, care must be taken to draw out that part of the scrotum to which the sheath of the vaginal canal is adherent, and to push them up as close as possible to the belly prior to shutting and confining them by ligature.

In the case of irreducible hernia, we must lay open the hernial sac, and by the introduction of the finger to ascertain the nature and situation of the stricture, proceed to release the contained portion of intestine according to the rules laid down for strangulated hernia. After the return of the gut, the clams are to be applied upon the cord, with the additional precaution that the opening made in the sac be included.

OPERATION FOR STRANGULATED HERNIA.—

The intention of this operation is twofold:—first, to remove the obstruction or impediment to the return of the strangulated viscus into the belly; secondly, to set up an obstruction to its descent again into the scrotum, or escape elsewhere. Towards the accomplishment of these objects it becomes necessary—first, to lay open the hernial sac; secondly, to ascertain the seat and nature of the stricture; thirdly, to divide or otherwise remove the stricture; fourthly, to return the hernia; fifthly, if required, to finish by castration. The instruments, &c., required are—scalpels, straight and curved bistouries and directors, dissecting forceps, curved scissors, clams, ligatures, clam-pincers, sponge, and a pailful of warm water.

SUPPOSING THE CASE TO BE INGUINAL HERNIA, the animal being cast upon his back, many advantages will be found to accrue to the operator should the situation afford a beam or a ring or anything over or through which he can manage to pass the hobble-rope coming from the hind leg of the hernial side, whereby he may obtain the power of extending it at pleasure, and abducting it from the opposite limb. Everything ready, and the assistants properly posted, the operator retaining the most handy of them in attendance on him, will extend an incision, begun about opposite to the external ring, down along the middle of the anterior surface of the cord, for the space of two or three inches; at the same time, provided there be no intestine actually within the scrotum, the testicle may be drawn out. The skin being thus divided, the operator will next carefully cut through the dartos, by which he will expose the vaginal tunic, now become the hernial sac, which is recognised at once by its compact albuginous texture. The most scrupulous nicety is required in

opening the sac, to guard against wounding the gut, and especially when the parts are much distended. The best mode of proceeding is, first, with the middle of the blade, to scrape through some of the exterior fibres, and afterwards, with the forceps, to dissect up, layer by layer, until we arrive at the innermost serous layer, that immediately enveloping the gut. Into this a hole is to be made, only large enough at first to admit the director, by the aid of which, either with the bistoury or the scissors, the aperture is to be sufficiently dilated. The incarcerated intestine, evolving under the knife, is now to be drawn out of the sac, and maintained extended by the pressure of a linen cloth moistened with some simple mucilaginous liquid, in order to facilitate getting at the stricture. The operator is then to pass one or two fingers into the hernial sac, and carry them onward to the seat of stricture; against which he must keep them steadily maintained, so that they may serve as a director to the probe-pointed bistoury, which is to be passed flatwise along them, with its edge turned outwards, and thus insinuated within the stricture. Being certain that the bistoury has passed the neck of the hernia, he has nothing further to do than to turn its edge forwards, still keeping it inclined outwards; and immediately he finds the stricture divided, the liberated gut will slip back into the belly, either all at once or by degrees. Some cases will be found to require an extension of the incision, or some further division of the stricture: much discretion, however, is requisite in these secondary cuts, inasmuch as the return of the hernia is always to be less apprehended after *small* incisions. Should the gut not spontaneously recede, a little dextrous manipulation may accomplish its return; in any case it will never be required to pass the hand into the rectum.

M. Renault mentions two cases which occurred to him in 1836, in illustration of this operation.

In the first he practised herniotomy, as described and recommended by Girard. He cut through and turned up the scrotum and dartos, and then penetrated with caution into the hernial sac, in which he found nearly two feet of intestine. He unravelled it, and gave it to an assistant to hold while he divided the ring; which done, with great difficulty he returned the whole into the abdomen. A clam was then applied upon the cremaster, and M. Renault was congratulating himself on the fortunate termination of the operation, when, the animal making a sudden plunge, the intestine again escaped through the ring, separated or lacerated the fibres of the cremaster above the clam, and protruded again quite as much as before. The intestine was once more returned, and the lips of the scrotal opening now held together by the continued suture: but all hope had fled; the animal died a few days afterwards.

A novel Operation.—As the above accident might often occur—it not

being in the power of the operator to prevent it—M. Renault conceived a notion, in a case where the strangulation was recent, the hernia not large, nor the tumefaction great, that it would be better to make an incision at the upper part of the flank, by the side of the hernia, and to endeavour manually to return the gut, even though it should have descended into the scrotum; nothing, then, would remain for treatment but a wound into the abdomen; and surgical experience has shown us that simple incised wounds, like this, may be generally managed. It is true that the method has proved in one case unfortunate; but then, there were *two* strangulated herniæ present; strangulation had existed twenty-two hours; and more than two feet of small intestine had entered the scrotum, and this was already distended with gas.

The Bowel being returned, the propriety of castration is to be decided on by the states of the cord, epididymis, and testicle. Should they be engorged, livid, and marked with purple spots, the operation becomes indispensable; because it may, performed in time, prove a preventive of congestion, peritonitis, and gangrene. It is to be practised only on the side affected, and in the ordinary manner, with the clams, *à testicule couvert*. Under other circumstances, although the parts may evince compression, still, so long as there be no signs of mortification, castration is not called for.

After the Operation, the animal is to be kept down, as prescribed after the reduction by the taxis; only the limb drawn up to the beam may have a little liberty given to it, and thereby the body allowed to incline somewhat to the opposite side (to that operated on), which will give the animal some relief. Every precaution is to be taken to prevent him from struggling or flinging about at the time he is released to rise up. He will require the same subsequent care and treatment as has before been detailed, in speaking of the operation for chronic hernia; only observing that this is a case in which relapse of the hernia is more to be dreaded.

Result.—By the chirurgical means stated, we can at all times succeed in reducing the strictured hernial viscus; but the result can prove favourable only in cases free from sphacelus: whenever the hernial production has become gangrenous, the operation can neither prevent, arrest, nor retard death; an event which commonly happens some hours after the reduction. In man, in many cases, we can establish an artificial anus; and indeed, afterwards, by Dupuytren's procedure, sometimes succeed in again restoring the natural passage. It is submitted, without conceiving it necessary to state the reason, that such practice is not available in the horse. This teaches us that the operation for a recent strangulated enterocele cannot be delayed but with the utmost danger. In fine, a gut once strangulated becomes the seat of pains rapidly

augmenting, and ending in the production of most violent convulsions; the stercoral matters, forced onward by the peristaltic action, accumulate within the portion of gut incarcerated in the inguinal canal, adding aggravation to the case. Parts so swift to take on gangrene are most urgent in calling for relief; and this can be rendered in no other way than by setting them free from strangulation.

When the testicle is not removed, the aperture in the scrotum is to be closed by suture. Commonly, adhesion between the testicle and its vaginal tunic follows this operation. M. Girard relates a case in which, from the incisions being too freely extended, the operation—which was finished by castration *à testicule découvert*—was speedily succeeded by *eventration* (or the escape of the intestines), whose ejection augmenting at every successive heave, became at length too voluminous to admit of the possibility of return. In another case, laceration of the stricture happened at the time the fingers were introducing underneath it, and thus its division by the knife became superseded: this is an event, however, not to be desired, much less promoted.

OPERATION FOR THE HERNIA OF CASTRATION.—If one might venture to direct attention to one part of the important subject of hernia in preference to another, to a practitioner in England, it would be the section now coming under consideration. Some sad occurrences are yet fresh in the memory of many veterinarians, which, were they to occur in the present advanced state of veterinary science, might not have the same unfortunate issue: at least, not in the hands of such among us as have taken the sound precaution—a duty incumbent upon us all—of making themselves as well acquainted with this as with other more practised branches of their profession.

The **ENGLISH METHOD OF CASTRATION** is of a nature to be converted by the presence of hernia into an operation pregnant with difficulty and danger. There is difficulty in prosecuting the operation, should its prosecution under such

circumstances be determined on ; and there is danger not only at the time of the operation, but after it is finished. In a prediscovered or even suspected case of this kind, it is far better that we should abandon our own and betake ourselves to the French method of performing castration — to that which by them is called *à testicule couvert*. The hernia being reduced, the wooden clams are to be applied upon the vaginal covering of the spermatic cord, and secured as close as possible against the belly ; special care being taken that no knuckle of intestine is left included within their gripe.

Even in a case where the vaginal tunic has been opened before any discovery of the hernia has happened to be made, after having effected the return of the gut, instead of prosecuting the operation according to the English fashion, it is advisable to have recourse to the French plan, and to endeavour to finish the operation still *à cordon couvert*, by detaching the vaginal tunic from its connexion with the scrotum, and extending it afterwards upon the cord, so that it may become included, together with the cord, within the clams. Cases do unfortunately occur, however, in which, owing to the impetuous and slippery descent of the hernial gut from the moment it becomes liberated from its confinement within the vaginal tunic, all our efforts to return, or even restrain the protruding bowel, prove unavailing, counteracted as they continually are by the struggles of the animal and the contractions of the abdomen.

In such perilous and embarrassing circumstances, it is not without danger we resort to the expedient of introducing the hand into the rectum to aid the reduction, which should always be most actively prosecuted during the interval the animal remains most quiet. Should every varied effort at reduction prove unsuccessful, the patient ought to be bled as he lies ; after which we may try the effect of emollient mucilaginous fomentations to the bowel. It would also be well worth our while to make trial of the tobacco enema. All these means failing, either to abate suffering or sufficiently relax parts to render our renewed efforts more successful, the case may be regarded as hopeless.

In a case of strangulation, the stricture, of course, must be divided ; though even this is a proceeding which does not always answer. When

the contractions of the abdomen are strong and frequent, dilatation of the ring serves but to facilitate the descent of the bowels, and the hernia in consequence rapidly becomes a voluminous mass, whose return is altogether impracticable.

The reduction effected, we should immediately set about dissecting the vaginal tunic away from the dartos and scrotum, that we may be able to draw it over the cord, and clasp both within the clams, which are to be applied and secured in the manner directed for castration *à testicule couvert*. This second compression must be made higher, if possible—certainly not lower, upon the cord, than the former—by means of the clams already applied for castration. When this high compression cannot be obtained with the clams, a ligature may be used, an advantage of which is its admitting of being fastened still closer to the ring.

Two cases occurred to M. Rey, of Castres, in which this practice of M. Girard's proved completely successful. In both, the hernia made its appearance during the operation of castration, after the application of the clams. In one he succeeded in reduction without disturbing the clams; and all he did further was, to sew the scrotum to the vaginal tunic of the cord. In the other case, he had to remove the clams to accomplish the reduction; but afterwards he replaced them. The suture has the effect of a temporary suspensory bandage, besides that of inducing inflammation, and its desired consequences, effusion and adhesion between these parts, and consequent obliteration of the inguinal passages.

Whatever advantages as a summary operation, and one that requires no after surgical interference, the English may seem to possess over the French method of castration, it must be admitted on all sides, that, where hernia is concerned, one is dangerous, and is not very unlikely to prove fatal; while the other is not only comparatively safe, but affords a good prospect of proving a permanent cure for the rupture.

UMBILICAL HERNIA.

The protrusion of any portion of bowel through the *umbilicus* or navel, forming a tumour at that part, is what we understand by *umbilical* hernia: it is technically expressed in one word, by the term *exomphalus*. The umbilicus or navel of the young animal, prior to birth, is open for the purpose of giving passage to the *umbilical cord* or navel string: speedily after birth, however, closure of it takes place; and, about the same

time, obliteration of the vessels of the cord. Should closure of the aperture not happen in due season, a portion of omentum, or knuckle of intestine, or both, is very apt to get pressed into it, and, for a time, to become imprisoned therein; thus constituting the hernia in question. I have not been in the way myself of seeing much of these accidents, although they must be common enough in large breeding establishments; I shall, therefore, betake myself for information to Hurtrel d'Arboval, and to such British writers as have published on the subject.

We learn from D'Arboval that exomphalus may either be congenital or accidental. The first is observable at the moment of birth, or speedily after. In the latter case the protrusion arises from the giving way, even after the navel is once closed, of that still lax and weak part, to the downward pressure of the viscera; a failure to which the animal is liable even up to his third year. The tumour at the umbilicus is soft, either oblong or flattened, and susceptible of augmentation on any violent effort; and, within the skin, possesses a sac. When omentum only is protruded, it has a doughy feel, wanting the elasticity conveyed by contained intestine. The intestine displaced is a portion either of the cæcum or colon; those being the lowermost guts. There is nothing dangerous about this hernia. Sometimes indeed, though rarely, it will disappear again of its own accord: when it does not, it may give rise to occasional colic, as well as incapacitate the animal for any kind of work; or it may augment in volume, and so become dangerous. On these accounts we ought not to trust wholly to nature for a cure.

The diagnostic between contained omentum and intestine is not always easy, and particularly when the tumour is but small. Nor is it of any great deal of consequence; our object being, whatever the hernial substance, to return it at once into the belly.

Reduction.—The animal having undergone preparation some days beforehand, by a suitable diet, is to be cast, turned upon his back, and while supported in that position, to have his hind legs bound together, and his fore legs likewise; and afterwards to have them, thus bound in pairs, extended apart from each other, in order to afford space for the operator, and facilitate the return of the hernial viscera. The taxis is now to be practised *secundum artem*, drawing out the skin at the same time that manipulation is practised to force up the hernia. The reduction effected, the skin is to be again pinched up and drawn out, and confined in the fold into which it is drawn either by clamps placed upon the duplicatures of the fold, or by sutures run through it, as close as possible to

the surface of the belly. The clams ought to be of extra length, and not to be squeezed so tight as to endanger sloughing of the included skin. In regard to the suture, some prefer one sort, some another; probably an imitation of what is called the cobbler's or saddler's stitch would afford most security.

In an OPERATION WITH THE CLAMS, the same as is recommended in ventral hernia, hereafter, great precaution should be taken not to include the intestine, or any part of it, within the grasp of the clams. This was inadvertently done on one occasion, by Mr. King, V.S., Stanmore, in a case of umbilical hernia, and the result was artificial anus at the umbilicus, out of which "the fæces came very copiously." With this the mare "lingered eight days," and then sank. Examination showed that "the intestine passed over the original aperture in the parietes, adhering firmly to its edges, and that a portion of it, of the size of a crown-piece, had sloughed away." But this slough did not take place "until at least a month after that of the sac."

LIGATURE is the curing process very successfully adopted by Professor Simonds. "Several cases of exomphalous," he says, "have come under my notice. I have been successful in all of them, as far as regards perfect reduction of the tumour. I first cast the animal, and, placing him on his back, grasp the hernial sac between my fingers, drawing it up from the belly, and being careful not to include any portion of the protruding intestine, of which there is little fear, except (which is not likely in so young an animal) adhesion has taken place between the peritoneum covering the intestine and that portion of the membrane lining the sac. Being safe with regard to these things, I take a strong waxed cord or string, and place it round the sac, as near as possible to the abdomen, and, pulling it tightly, I pass it round the sac two or three times, and securely fasten it. The patient may then be permitted to rise, and in a majority of cases, no after-treatment will become necessary. In the course of a few days, the parts included in the ligature begin to slough, and, the healing process taking place, the sac is entirely got rid of, and the cure perfected." "Occasionally, about the third

or fourth day, a second ligature may be necessary, from the first having become loose and ineffectual. In one case I was unsuccessful: tetanus occurred three weeks after the operation." "I have never seen a case of *strangulated* umbilical hernia: I do not know of there being one on record."—'VETERINARIAN,' vol. xii.

Of Fistulous Umbilical Hernia, and consequent artificial anus, a novel and interesting case is placed on record by Mr. Dick, in 'THE VETERINARIAN' for 1833. The horse, four years old, was bought by Mr. Dick at Kinross Market, with a considerable enlargement of the umbilicus upon him. He did his work for some time, but it was with stiffness and unwillingness. Shortly afterwards he was seized with a "ting," and a farrier was sent for, under whom he got better. He was put to work again, but proved still stiff and unwilling. Shortly after, "an opening formed at the navel, by which the whole of the fæces were passed off." Mr. Thompson, V.S., Redstone, was sent for, who "stitched up the opening, which was large enough to admit a person's fist, and applied a roller with a pad of tow over it; also occasionally adhesive plaister." "Adhesion took place, and granulations formed very rapidly for some time; but a very small opening remained, which seemed extremely obstinate, yet was making a little progress, and to all appearance would have been entirely closed in a short time,"—when he died. The intestines proved in many places perforated by ulceration, apparently the effects of lumbrici. There seemed to be no disease about the umbilical opening, except adhesion between the intestines and the parietes of the abdomen. I found it to be a part of the ileum that had fallen into the opening, about a foot from the cæcum. Nature had formed a tube of about two inches long, quite distinct from the ileum, by way of a rectum; but when it was a good deal healed up, air seemed to be sucked in by it, and passed off *per anum*. In drinking, the water passed off by it without any of the aliment being mixed with it: it seemed almost as clear when passed as when drunk. If he got the benefit of his meat, he received no benefit of his drink, for it passed off as fast as he drank it; and from this cause, apparently, he became very much emaciated. During the time Mr. Thomson attended him, he showed no symptom of disease, save a slight attack of gripes. Before death, the wound became reduced to the size of a quill, discharging white mucus, but no fæces. He was allowed only two pints of water a day, with some pea-meal, with a small quantity of hay. When Mr. Thomson first saw the horse, he gave a clyster of water-gruel, which occasioned much inconvenience, "seemingly by emptying the posterior bowels too much, as flatus passed, seemingly, from the orifice of the anus, and he worked like a pair of bellows for four hours." Mr. Thompson

then injected a solution of sulph. zinc at the orifice, which caused griping pains for a short time; but they did not recur, although this was afterwards frequently repeated.

Analogous to the above operation in principle, but simpler in application, is one that has been practised with great success by Mr. Pattie, Yoker, Glasgow. His account, in 'THE VETERINARIAN' for 1836, of his mode of operating, is—"The colt is not cast, nor submitted to any restraint beyond that of having his head held. The hernial tumour is emptied by forcing its contents into the belly; the loose integument forming the pouch is gathered into the left hand, while the right surrounds it by a ligature placed as closely as possible to the abdominal parietes, and drawn sufficiently tight to interrupt the circulation. On the second day there is considerable tumefaction around the incarcerated integument, which also in a slight degree partakes of the engorgement, feels cold, and often clammy and moist. When the ligature has not been sufficiently tight, or the pouch so large as to require strong compression for arresting the circulation, it is hot and tender. In all cases more than one ligature is necessary. Generally on the third day the first cord becomes loose. The circle it embraces has been reduced, partly by absorption and partly by incision, and there is no longer any compression. If neglected after this, the tumour rapidly increases in size, and is attached by a neck whose diameter is limited by the ligature. It is necessary, therefore, to see the patient twice or thrice a week, to renew the ligature. The second, third, or fourth, should so many be required, must be placed above that which preceded, and close to the abdomen. They relax in from two to three days, and are then useless, save for the purpose of supporting those which follow. The whole drop off, along with the tumour, in from ten to twelve days. The place from which the pouch is detached is neither raised nor excavated. It is a flat granulating surface, as large as a halfpenny, and seldom broader than a half-crown. No further treatment is required, save, perhaps, a little astringent lotion to hasten cicatrisation, or an ointment to exclude flies."

Mr. Wells, V.S., Norwich, in 1852 sent to 'THE VETERINARIAN' the following excellent practical observations on this subject:—"Cases of umbilical hernia are very common in breeding districts. Many being slight require no treatment at all: others, however, if not attended to, remain unsightly for life, occasionally producing spasm, strangulation, and death. The old mode of treatment (and I believe many practise it now) was, to place the animal on its back, return the bowel, insert four skewers through the

loose skin, and apply a ligature. This had the double effect of removing the superfluous skin, and producing adhesive inflammation of the sides of the sac; and, in a general way, the cases did well. Occasionally, however, death ensued, either from peritoneal inflammation or locked jaw. Thinking a safer mode of treatment might be adopted through the influence of pressure, from having known cases in the human subject cured simply by wearing a truss, I was determined to put it to the test. Accordingly, I had a kind of truss apparatus made for the purpose, which I am happy to say has proved successful in many cases. It consists of a common girth, properly sloped to the body, having a stiff piece of oval-shaped leather introduced inferiorly, to come in contact with the rupture. This should be buckled on moderately tight, and retained in its situation, as follows:—Place a common collar on the animal's neck, to which three straps are attached, one on each side, and the other at the brisket. Two pieces of webbing should be attached to the main girth, with buckles at the opposite end, to meet the side straps, and a piece of leather, instead of webbing, to meet the brisket one. This latter should be forked or split, part of the way, so as to admit of its being attached to the oval piece of leather covering the rupture. These are then to be buckled to the three straps coming from the collar, by which means the main girth is effectually held in its proper position. Over the whole a common circingle may be placed, just behind the elbows (the usual girthing place), in order to keep the apparatus snug and close to the body.

“The animal thus harnessed should be turned into a loose box, and fed well, the object being to force the system as much as possible. The best time for applying the truss is when the animal is taken off the mare. In a general way, about three months' wear of the truss will be found sufficient to effect a cure. The *modus operandi* appears to be this:—pressure keeps the bowel within the abdomen, thereby giving the aperture an opportunity of closing, which in many cases it will do most completely. But, even should it not, you may depend upon it not getting larger. The

bowel, from the general development going on in the system, hastened by the good keep, will soon do so, *i. e.* get larger, and consequently will not dip into the same opening, even should it remain. Partial or complete adhesion of the sides of the sac will take place, followed by an entire removal of the unsightly pendulous bag, with its contents, which constituted the disease."

VENTRAL HERNIA.

VENTRAL, sometimes called ABDOMINAL HERNIA, is the name given to bowel protruded through any part of the abdominal parietes—the navel and other apertures and canals excepted—the consequence of which is the production of a tumour somewhere upon the external surface of the belly: therefore, ventral hernia essentially differs both from inguinal and umbilical herniæ in the circumstance of the protrusion occurring—not through any *natural* aperture, as in both those instances, but—through some incidental breach in, or interval between, the parietes.

CAUSE.—This breach is commonly the result of laceration of some of the muscular or tendinous fibres composing the parietes of the abdomen, which in general is occasioned by a kick from another horse, or by a blow of some sort.

The COMMON SITUATION of the hernia is by the side of, or rather a little behind, the borders of the false ribs, amid the fleshy fibres of the internal oblique and transverse muscles. The obvious reason for its more frequent occurrence in this place, is the prominence and exposure of the part, and consequent greater liability to receive kicks and blows.

The TUMOUR, which in magnitude may be compared to a small apple, has a soft, puffy, elastic feel, and by pressure can be made to disappear, from its contents being in general readily returnable into the cavity of the belly. At the same time, the breach itself often being of sufficient breadth to admit of the skin—which hangs loose after the reduction of the hernia—that also is often pushed into it upon the ends of the operator's fingers: in which case the borders of the breach or opening through the abdominal parietes can be,

with the fingers, distinctly traced. These signs, however, are on occasions, as observed by Hurtrel d'Arboval, marked by accompanying effusion into the surrounding cellular tissue : at least, when that exists.

NEITHER PAIN NOR INCONVENIENCE, nor, in fact, ill consequences of any sort, *commonly* result from ventral herniæ. Horses having them do their work and maintain their health quite as well as others ; nor does general experience warrant us in assigning other danger to them than such as may arise from their liability to external injury, particularly from the spur of the rider. I have seen hunters so affected, and apparently nothing lessened in intrinsic worth by it. I have known troop-horses similarly ruptured, which have, without any surgical aid whatever, done their duty to the last, without experiencing any sensible alteration in the tumour itself, or the remotest sign of colic or abdominal disease of any kind, during their lifetime. Notwithstanding, however, this general exemption from inconvenience even, much more from pain or danger, still cases may and do occur in which from the volume, or situation, or nature of the hernia, or from its liability to become strangulated, it may be not only advisable but incumbent upon us to perform some operation, or, at least, to take some measures towards keeping the hernia permanently reduced.

The CONTENTS OF THE TUMOUR usually consist of a knuckle of intestine : the omentum being too short to become protruded, unless it be dragged posteriorly towards the ribs. Ordinarily, I believe ventral herniæ possess no proper sac, the peritoneum becoming ruptured by the blow which produces the eventration : indeed, in most instances, their only covering appears to be the common integuments.

TREATMENT.—In the generality of cases there is no necessity or call whatever for adopting any kind of treatment. Still, it is right we should be acquainted with what we have it in our power to do in a case of need or desirableness ; for, as I said before, now and then a case presents itself requiring remedy. Providing the accident be recent, the subject young, and the breach but small,

there appears a prospect of success by the use of a common circingle, made broad, and placed backward enough to confine a pad of tow or folded linen upon the part, after the hernia is reduced. Success, however, by such simple means must entirely depend upon their judicious application and persevering continuance. Should the volume of the tumour or intractability of our patient be such as to render means of so simple a character inapplicable or unavailing, Hurtrel d'Arboval recommends us to pinch up the loose skin covering the hernia, after it is reduced into a fold, and apply long clams upon the duplicature, sufficiently compressed to maintain the fold without running the risk of obstructing the circulation: the same procedure in fact as is recommended by him for umbilical hernia, taking great care to avoid what occurred in Mr. King's case, viz., the intrusion between the clams of any portion of intestine. Mr. Ions has adopted this plan of cure with good success.

In April, 1839, a bay filly was brought to his establishment at Waterford, who had received an injury two months before from the horn of a cow between the cartilages of the false ribs, inclining to the flank. The opening was six inches in length. No inflammation ensued, and Mr. Ions felt inclined to try what pressure would do. Mr. Ions first returned the intestine, and then placed a pair of castrating clams over the skin and pouch, and had the parts kept wet with a solution of nitre. In a fortnight the whole sloughed away, leaving only a thick cicatrix the length of the clam. During the latter part of the time a solution of sulphate of copper was used. The filly is now at grass, perfectly sound.—‘VETERINARIAN’ for 1839.

Mr. Simonds, V.S., Twickenham, has adopted the same plan of cure as has been practised with such happy results by Mr. Pattie, in umbilical hernia, viz., *ligature*. The following case will illustrate his mode of procedure, at the same time that it evinces the complete success by which it has been attended :

A mare, in leaping some hurdles, forcibly struck her right flank, the result of which was a rupture. Several months afterwards Mr. Simonds saw her, and purchased her for experiment. “The tumour measured eight inches in circumference at its larger and upper part, and in length

ten inches, tapering to a somewhat rounded point. It was situated directly in the right flank. It could easily be pushed back into the belly, and appeared not in any way to interfere with her health or capability for work. She was, however, noticed to be generally resting upon the leg on that side. She having been prepared by venesection, physic, and diet, and having satisfied myself that there was no adhesion between the gut and integument, I pushed back the intestines, and, grasping the sac with my right hand, I desired my assistant to pass a strong waxed cord around the base of the sac, as near as possible to the body, and to draw it as tight as he could, and secure it. She seemed to suffer a good deal for a short time. In a few days, sloughing had loosened the first, and rendered a second ligature necessary, and after that, a third. In three weeks, the parts had healed, leaving very little appearance of rupture, and of the opening which remained gradually diminished. She was shortly afterwards put to post work, at which she continued to our knowledge three years."

The old operation with skewers is preferred by that excellent practitioner, Mr. Tombs, V.S., Stratford-on-Avon. "After condemning one operation it becomes me to point out a safer," says Mr. Tombs. "A more scientific one I cannot; but I think I can a less dangerous one (than suture). The operation I allude to is, I believe, attended with invariable success."—"The animal is cast upon his back. The operator returns the bowel, and gathers in his hand all the loose skin over, and for a considerable distance around, the hernia. He then pushes three or four join skewers, about 14 inches long, transversely through this skin, and one or two longitudinally, over the hernia, and a strong cobbler's end is tied under the skewers, and drawn tight. The skewers are next twisted round with a pair of pincers; otherwise, the points would penetrate the skin of the adjacent parts of the abdomen, at the time the animal lies down. The patient is then liberated, and kept short of food and water for a few days."—'VETERINARIAN,' vol. XIV., pp. 206-7.

In confirmation of Mr. Tombs' Treatment, I quote the following case of Mr. Holmes, V.S., Ash. Mr. Holmes was called to attend a yearling colt, with ventral hernia. The hernia was posterior to the umbilicus, and would have filled a half pint measure. "I determined," says Mr. Holmes,

“to operate upon it, after the method of Mr. Simonds. All appeared to be going on well for a fortnight, at the end of which time the lax suture sloughed away, and the intestine came down as before. I operated upon it again in the same manner, and again unsuccessfully. I then despaired of effecting a cure, and was upon the point of recommending my patient to be destroyed, when upon turning over the papers of the XIVth volume of ‘THE VETERINARIAN,’ my eye lighted upon the paper of Mr. Tombs, in which he recommends the insertion of skewers through the integument, and the application of a ligature over them; which method I immediately adopted, and am happy to say with complete success.”—‘VETERINARIAN,’ vol. XVII., pp. 19-20.

In the same volume of ‘THE VETERINARIAN,’ p. 120, Mr. John Scott, V.S., Kildare, writes, “I operated successfully on a thorough-bred filly, in whom an umbilical hernia had existed from birth. It was as large as described by Mr. Holmes last month, and was similarly situated. Mr. Tombs’ operation succeeded admirably, for I was enabled to twist off the sloughing parts in fifteen days; indeed, that might have been done sooner, and the cure accomplished in the same time as in Mr. Tombs’ case.

FIRING AND BLISTERING have found an advocate in Mr. Horsburgh, V.S., Castleton, N.B. His case, from which I take the following account, is contained in ‘THE VETERINARIAN’ for 1838.

In July, 1835, a grey horse, the property of Mr. Laing, farmer, of Pardivine, in breaking out of a park, staked himself on the fence, and was with some difficulty got off. He was much hurt; fever took place on the third day: on the fourth Mr. Horsburgh was sent for. The abdomen and chest were much swollen. The fever was reduced by venesection and purges, and from the swelling, a few days after, fluid was let out by puncturation. The general tumefaction disappeared, but left a swelling in the left iliac region. Mr. Horsburgh was in doubt whether it was hernia or abscess. He thought the latter, and punctured it. Bloody fluid escaping, he thought he was right, and therefore enlarged the opening a little, when intestine protruded. The opening was immediately closed with pin and tow. No ill consequences resulted; the wound healed, the swelling subsided, and nothing remained but the

hernial sac, measuring ten inches in length and seven inches in breadth, and protruding to the extent of four inches. The horse being perfectly healthy, his owner would not consent to any operation; until, one day, symptoms of strangulation being apparent, he grew frightened, and gave the case up to Mr. Horsburgh. Of the symptoms of strangulation he recovered; and therefore Mr. Horsburgh, having duly prepared him by physic and regimen, put in practice the operation he had at first proposed. Both the abdomen and hernia became considerably reduced by the physic and regimen, which latter consisted in nothing else but as much boiled barley as Mr. Horsburgh thought would keep life in him. He first fired the tumour through its whole extent, in lines about an inch apart, and pretty deep, and then applied a strong blister, continuing the same restricted regimen until the wound was healed. It was then a little larger than a person's hand. Mr. Horsburgh repeated the firing and blistering. The result fully answered his expectations. The horse has stood the test of two years' work, and only on minute inspection can the lines of firing be seen. The object of the operation was to excite such an inflammation as would extend to the inner parts, and cause adhesion of the intestine, and so prevent its protrusion through the aperture.

A CASE OF VENTRAL ARTIFICIAL ANUS was, in 1837, sent to 'THE VETERINARIAN' by Mr. Karkeek, V.S., Truro, which, although of chronic character, from the summary manner in which it was cured and disposed of, cannot fail to prove to us highly interesting.

"Two years since a pony mare received an injury from the horn of a bullock on that portion of the abdomen situated between the cartilages of the false ribs, inclining a little to the left side, producing a ventral hernia about the size of a cricket ball." From a kick received upon the same place from the toe of the shoe of a boy, very serious injury resulted, which terminated in an opening through the lacerated muscles into the colon itself; "being that portion of its second flexure which forms the upper and anterior arch, and the liquid and pulpy contents soon issued freely from the aperture. The mare continued for three weeks in this state, when I was requested to examine her—about the 6th of January. I found the opening nearly large enough to admit my four fingers, and it had a very unhealthy appearance. The discharge of pulpy and watery food was great, and the smell very offensive, so much so, that it was with difficulty any person could be found to attend on her. The pulse was between 50 and 60, and the appetite tolerably good."—The mare being with foal, and an old favorite besides, her owner was very desirous to have something done. There were two favorable circumstances—the length of time since the injury and the absence of in-

flammation.—“Having cleaned the wound,” says Mr. Karkeek, “I closed the opening with a strong suture of pack-thread, with a common packing needle, taking in as much of the integuments and abdominal muscles as possible. I then applied a pledget of tow, soaked in a solution of chloride of lime, and supported the whole by means of a thick woollen bandage, laced along the spine. I ordered the wound to be cleansed and the solution to be applied every morning, and her head to be tied to the rack, to prevent her lying down. About five weeks afterwards, being in the neighbourhood, I called to inquire after my patient, when to my surprise I found her alive and well, the wound having completely healed. Had this case happened nearer my residence, I should have endeavoured to have instituted some experiments with regard to the process of digestion on different kinds of food; and this, I believe, might have been done without endangering the life of the animal, as there was a copious discharge of food for three weeks previous to my attending the mare.”

IN CASE OF STRANGULATION, the operator would, of course, first proceed to the employment of the taxis, and use every manual dexterity and other aids to render it effectual. Should all his efforts fail, he must, by simple incision through the skin, expose the hernia, and with his probe-pointed bistoury incise the border of the constricting aperture, making his incision in the direction in which the muscular and tendinous fibres in the vicinity run, as is prudently enjoined by D’Arboval. The gut returned, the wound in the skin should be carefully closed by suture, and a compress and roller, if practicable, kept applied over it.

I shall close this division of my subject with the transcript of a case related in ‘THE VETERINARIAN’ for 1839, by Mr. Simonds, together with an account of an operation for it which reflected the greatest credit upon him and the professional gentlemen present with him on the occasion.

The subject was an aged black mare, which was brought to Mr. Simonds’ infirmary October 18, 1837, with an old injury, received, he was told, from her falling in the shafts of a loaded cart:—“The most extensive rupture Mr. Simonds had ever seen presented itself on the left side. The sac formed by the skin, which was not broken, not even the hair rubbed off, extended as far forward as the cartilages of the false ribs, and backwards to the mammæ. A perpendicular line drawn from the superior to the inferior part of the tumour measured more than twelve inches. It appeared, from its immense weight and size, as if the larger part of

the colon had protruded." There was little or no constitutional disturbance. She was bled; a cathartic given; and the tumour constantly wetted with cold water, and supported by a bandage. The next day Mr. Simonds submitted the case to Messrs. Morton, Spooner, and Youatt. They urged him to return the protruding viscera, and secure that return by operation. On the 24th she was operated on. Opium was given to lull sensation and pain,—a dose of *ʒiiss tinct. opii*. She was cast and secured, and propped upon her back by straw. Her head was made fast to a ring in front, and one hind leg was fixed to another ring. The effects of the opiate were manifest throughout the operation. "After a careful examination, externally as well as per rectum, in order to ascertain the situation and probable size of the laceration of the muscles, an incision was carefully made through the integument into the sac, in a line with the inferior border of the cartilages of the false ribs; which incision was seven inches in length. This, as we had hoped, proved to be directly upon the aperture in the muscular parietes of the belly. The intestines were exposed; and, after having sufficiently dilated the opening to permit the introduction of the hands, they were quickly returned, portion after portion, into their proper cavity, together with a part of the omentum. At times it required our united strength to prevent the escape of the intestines, and which was only effected by placing our hands side by side, covering and pressing upon the opening. By these means we succeeded in keeping in the viscera until we were satisfied that we had replaced them all within their proper cavity. A strong metallic suture of flexible wire was then (by means of a suitable needle) passed through the edges of the laceration, taking in the peritoneum and portions of transversalis, rectus, and internal abdominal muscles, and other sutures embracing the same parts were placed at convenient distances, so as nearly to close the aperture. Two sutures of smaller metallic wire and three of stout silk cord were then passed through the external abdominal muscles, and their aponeurosis, which effectually shut up the opening. The integument was then brought together by the interrupted suture, taking care to bring out the ends of the other sutures. The operation occupied rather less than an hour, our poor patient being occasionally refreshed with some water gruel." After she was risen, a compress and suspensory bandage that could be tightened at pleasure, were placed upon the wound. Next day, the sac which had contained the hernia was filled with serous effusion. A dependent opening was made, from which three or four pints escaped.—26th, Suppuration.—30th, Enabled to walk out; skin sutures came away.—November 4th, Sloughing, in which three metallic sutures came away. A sinus formed towards the mamma through which tape was passed. The appetite up to this time had been tolerably good, and the pulse had

ranged between 52 and 56.—6th, So far recovered as to be turned into a paddock for a few hours.—11th, “An accident occurred which nearly brought my hitherto successful case to a fatal termination. She had got into a pond which lay at the bottom of the paddock, and was fixed in the mud; and was, when we arrived, making violent efforts to release herself. After much difficulty she was dragged out, so much exhausted as to be incapable of rising. A gate was procured, and upon that, well covered with straw, she was, by two horses, drawn home. She had now every attention paid her, and was raised in slings for support. In this ‘cradle,’ she stood quite at ease. She gradually recovered her strength; but it was not until twelve weeks after the operation that the metallic sutures came away; a fact showing the advantage of these over other sutures—the different degrees of irritation produced on the living animal fibre by the different substances we employ as sutures. To the use of the metallic sutures I attribute the success of my case; and for their introduction we are indebted to Mr. Spooner. My patient, shortly after this, went to work on my farm, where she continues to the present hour, doing her full share of labour.”

This was from the beginning, and all through its course, truly a formidable case. The only question concerning it arising, in my mind, is, whether or not a simpler operation might not have proved effectual?—such an operation as the French veterinarians perform, or as Mr. Horsburgh, by the aid of starvation, succeeded with? I cannot, of course, be supposed to be offering an opinion on a case I never saw: I am but holding these simple operations out as, in fitting cases, worthy of trial, in preference to formidable and dangerous ones.

DIAPHRAGMATIC HERNIA.

Among the reasons assigned by Girard in his inestimable work on hernia for the prevalence of this affection in men in comparison with animals, is adduced, the oblique inclination, forwards and downwards, of the axis of the abdomen in the quadruped, the consequence of which is, the continual gravitating tendency of the abdominal viscera against the diaphragm. This visceral pressure, particularly when the bowels are full, must operate, by impediment to the action of the diaphragm, in rendering that muscle more

liable to rupture and laceration under violent efforts of body or of respiration; and when once a breach has taken place, the same inclination to roll forward will render the insinuation of some viscus—intestine most likely, from that being the most loosely attached—a highly probable consequence. Such is the pathology of phrenic or diaphragmatic hernia. It is possible for the hernia to happen from some *separation* of the fasciculi of the muscle, or in consequence of *dilatation* of some one of the natural passages through it; though veterinary annals, that I know of, furnish no such cases. Blows upon the body, or sudden and violent falls of it, are the ordinary causes of rupture or laceration of diaphragm; and then the hernia follows in the manner I have described.

The SYMPTOMS, when this hernia has happened, have been found to be—as indeed might have been expected—a compound of those of ruptured diaphragm with those of other painful herniæ; and, by accurate observation of such combined expressions of suffering, when present, must the case be made out. There will be symptoms of violent colic, and these symptoms may so simulate “gripes,” that unless the history of the case incline us to think otherwise, the horse may die under the belief of those in attendance on him, that the case is nothing but *colic*; at the same time there will probably be some extraordinary agitation in the respiration—some working of the flanks, more like broken-wind, perhaps, than common violent breathing. The late Professor Sewell used to say, that in this complaint “the horse usually sat upon his haunches like a dog,” a posture which affords the intestines, as he very justly remarks, every facility of rolling back again out of the chest into the belly: the cases, however, which have been published do not appear to bear out this observation. On the contrary, Mr. Daws says, in rupture of the diaphragm, “he has generally seen the horse push his chest on the ground, and not sit upon his haunches.” Vomiting has been known to be present.

The Hernia may not happen until *some time* after the Rupture. A very interesting case, published by Mr. Cleaver, V.S., in ‘THE VETERINARIAN’ for 1836, seems to show this.

The mare, the subject of it, had been hunted with the fox-hounds three weeks previous to her attack, carrying fourteen stone, and had fallen quite exhausted at a fence. She was in the field once after this, but had little to do. On the day of her attack, she had been ridden gently for seven miles. She did not sweat on her return, neither was any fault found with her going. And yet a few minutes afterwards an attack of violent apparent colic set in. Mr. Cleaver viewed the case as one of intus-susception, and very judiciously proposed, as a dernier remedy, that she should be bled to *syncope*, which was done by letting the blood flow in a full stream as she lay down. Presently she broke out in a cold sweat, and after lying quiet for about ten minutes, after several attempts got up. Her flanks worked violently; she rocked, her legs tottered, she stood trembling for a minute or two, and then dropped as if she had been shot. "*There was the most violent and peculiar lifting of the chest*" Mr. Cleaver had ever seen. She died in less than five hours after the attack. "An opening was discovered in the left side of the diaphragm, through which six yards and a half of the small gut were drawn into the chest; and the gut was so firmly strangulated, that it could not be moved either way without danger of breaking. One part of it adhered to the posterior part of the diaphragm. The intestine within the chest was in the highest state of inflammation. The mesentery was torn in several places. There was also a tumour on the mesentery which contained about a pound of dark coagulated blood; about four quarts of blood were likewise effused within the chest, which had flowed partly from the various lacerations, but principally from this tumour.

A case occurred to myself illustrative of the same remark. A troop-horse was shown to me on the 4th of April, 1853, very lame in his hind-quarters from having slipped up and fallen. The regiment marched five days afterwards to Windsor, whither he had to be taken per railway. On the 7th, I ordered him for his lameness, physic and fomentation; he having then no other symptom; but on the 11th, the day the physic had "set" in the morning, the horse (17 years old), was seized with symptoms of "gripes." I was called at 7 o'clock in the morning to him; found him suffering from, apparently, violent colic, which I felt at first inclined to connect with the operation of the physic. He would, in spite of all we could do, lie down and roll upon his back, the position he was fondest of; the pulse was neither small nor thready. The pains were periodical, every five or

six minutes, and very sharp ; in fact, latterly, the pain was so excessive as to drive him to a state verging on delirium. It would, amid other symptoms of restlessness, bore his head with dilated pupils forward, like a staggered horse. *Post mortem*—was found a rent in the diaphragm, extending from the spine to its middle. The margins of the rupture did not indicate *recent* laceration. The stomach, which was quite full, had become ruptured, and with it part of the duodenum, was within the chest. It is my opinion that the slip-up and fall, occasioned rupture of the diaphragm, and that at some subsequent—perhaps remote—period, the hernia took place. The case is published in ‘THE VETERINARIAN,’ vol. xxvi. p. 49.

THE HERNIAL PARTS consist commonly of intestine ; and of the small, in consequence of their loose attachment, more frequently than the large. In Mr. Cartwright’s case the cæcum had entered the chest ; and in another, a portion of mesentery was found there. In chronic cases, the hernial bowels have been known to contract adhesions to the membranes in the chest.

STRANGULATION happens occasionally in diaphragmatic as in other herniæ. It may speedily follow the incarceration, or it may supervene after many weeks or even months, in consequence of some change having taken place in the volume or position of the viscera. Violent inflammation results from constriction, and mortification follows.

Both rupture and Hernia of the Diaphragm may exist, and yet the horse appear unaffected by any disease—nay, in perfect health. Various circumstances tend to this result, the chief being, the portion of the diaphragm that is ruptured, the extent and direction of the rupture, the viscera received into it, their state of constriction. Laceration of the superior or fleshy part of the diaphragm, where the crura are attached, is suddenly fatal ; but in the inferior or tendinous part, considerable rent may exist without materially disturbing the respiratory functions. The late Professor Sewell has satisfactorily demonstrated these facts ; Mr. Cartwright’s

case, related at page 189, is likewise illustrative of the same ; as is likewise my own, afore mentioned.

REMEDY.—For so distressing a case, I am afraid we possess none, even supposing we were adept enough in practice to make the case out. Unless with D'Arboval, we feel ourselves warranted in making an incision into the left flank, and through it manually exploring the inside, and afterwards taking such measures as appear to be required. The animal *may* survive such an operation ; the disease, he cannot.

Does Hernia constitute Unsoundness? In answer to this, there exist various opinions. No doubt it does in some forms, when it comes to require treatment ; but whether it does in such forms or stages as create no inconvenience to the animal whatever, and never of itself does, or is likely to do, unless it receives injury, call for treatment of any kind, is another, and a distinct question. For a good deal of discussion on this point, see ' VETERINARIAN ' for 1834, pages 426-478 et seq.

PROLAPSUS ANI.

PROLAPSUS ANI, *proctoceles*, *inversio recti* (or, as the French denominate it, *renversement du rectum*), are so many appellations for a disease which, if one may judge from the paucity of cases on record, comes but rarely under the notice of the veterinary surgeon—even in horses, though oftener among them, it is said, than in other animals ; still it is a disease which it behoves him both to understand the nature of, and be prepared with remedies to remove, whenever it does happen.

DEFINITION.—It consists in inversion and prolapse of the mucous coat of the rectum ; either confined to the lining membrane itself, or otherwise, involving more or less of the entire intestine along with it.

The ASPECT of the protrusion will depend upon the nature and volume of the parts ejected, as well as upon the time such evolution has been in existence. When recent, so readily does tumefaction of the parts follow their protrusion,

that this speedily opposes all attempts at return, should the animal make any; though, in truth, his efforts in general have the effect of straining more gut out, and with his straining, in some cases, lacerating the membrane, and thus augmenting, instead of diminishing, the evolution, while it gives rise to pain which was not felt before. In this manner arises a large, sometimes enormous, rotund, red, rugose, efflorescence, consisting of cylinders of mucous membrane, having an aperture closed, through constriction, in its centre, though, while open, issuing a mucous and sanious matter, especially at such time as the animal is straining afresh. The circumflex action of the sphincter ani around the neck of the swelling, together with its distension with gas and the action of the air upon its surface, all add to its increase of volume, and change of colour, as well as to augment the pain; while the power at the same time enhances the difficulty of any effort the practitioner may make towards effecting a return of the protruded gut. With its augmentation of volume comes a deepened redness, turning, through the constriction of the sphincter, to a darker and even purple hue, the membrane becoming, at the same time, inflated and œdematous; and gradually changing its colour from red to yellow and brown, though still having a humid shining aspect, now becomes glairy from albuminous secretion, which is not only mucous but at times purulent.

CAUSES.—These may be summed up in irritation, either direct or sympathetic, of the mucous membrane lining the anus and rectum. It is possible that prolonged constipation, by giving rise to violent straining efforts at expulsion of dry and hardened fæces, might bring it on; or even the strains of parturition. The action produced by excessive purgation may cause it; more especially irritation of a mechanical kind, arising from direct injury to the membrane or rectum during the operation of raking or manual exploration of the gut or of clystering. It may prove an accompaniment, of an enteritic, colicky or diarrhœal condition of bowel. It is possible it may ensue on nicking; though I never knew it to follow that operation—violent struggles indeed of any kind.

In such a case as mentioned in 'THE VETERINARIAN,' vol. xxv, by Mr. J. Brown, V.S., London, wherein the horse "had forced out nearly a foot of the rectum in struggling violently to release himself," while being cast.

TREATMENT.—The formidable, and indeed awful aspect of this disease, is apt to operate in the mind of the owner of the animal favorably for the veterinary surgeon, inasmuch as it gives rise to his being called to the case sooner than he otherwise would have been. Should the summons be an early one, at the time that the protrusion is recent and the volume of the protrusion nothing alarming, judicious exercise of the taxis, if employed at the moment, may succeed in the return of the gut. Distributing the fingers of both hands, over the rugose and turgid surface of the protrusion, steady, firm, and forcible pressure ought to be maintained against it for such length of time as appears to afford any chance of success, augmenting the force used whenever there is any remission of straining. Should the first efforts of this description fail, the protruded mass may have its bulk lessened and constricted as much as possible by local application of some sort, than which none offers a better chance of succeeding than such as follows from sudden and intense cold, though to a part so sensitive and vascular, the practice is not devoid of danger. Ice may be powdered and enclosed in a linen bag, so as to form a sort of bolster which may be held or braced with firmness upon the tumefaction. The reverse of such treatment as this, however, though the object be the same, is generally preferred; viz. fomentation, medicated or not, and scarification of the exposed membrane; though in other cases astringent applications are employed, with a view of causing contraction and diminution of the mass, such as lime water, decoction of oak bark, solution of alum, &c.; and while such proceedings are going on, it is advisable to have the hind parts raised: supposing we succeed in accomplishing the reduction, the chances are in favour of a relapse of the *prolapsus*, and these chances seem great in proportion to the facility with which the return of the inverted gut has been effected: indeed, so constant and

troublesome does the return in some of these cases become, that it is necessary to contrive some sort of truss to oppose the descent, the same as is done for rupture in man. Mr. Dycer's truss consisted of "a new wet chamois leather, a breast-plate, and a hip (human) truss." Should constipation be thought to operate against reduction, in addition to clysters, we may exhibit cathartics and aloes in solution, and should there be plethora and great irritability in the membrane of the rectum and anus, a bloodletting will be advisable; while an opiate or belladonna clyster will be advantageously administered in order to allay all local irritation as much as possible.

As a dernier and effective mode of procedure in prolapsus ani, when the case proves either irreducible or, after return, continually protrudes, on any slight effort, such as coughing, afresh, we have recourse with safety and certainty to an operation consisting in excision of more or less of the inverted membrane enveloping the protruding portion of gut. This is an operation of ancient date, though to Dupuytren is ascribed the credit of introducing it into human practice, and to the French veterinarians that of transplanting the same into veterinary practice. Formerly the actual cautery was the instrument employed for the removal of the parts obstructing reduction; but in our own day this has been thrown aside for the scalpel, an instrument quite as effective, while the simple act of cutting with a knife gives so much less pain than cutting or dividing with the actual cautery does. In general, it is considered necessary to cast the horse for the operation; but Mr. Gregory, V.S., Bideford, "did not cast the mare, but merely put on a side line, and had one leg held up, and the tail kept on one side;" and most assuredly the standing position of the patient is one which, in such an operation, offers no mean advantages to the operator, providing he can avail himself of it without any personal danger. A great preservation against refractoriness in an operation of the kind, at the moment when any pain is felt, is a twitch well put on and well and *timely* turned. The horse secured, and the tail turned aside out of

the way, an incision forming a circle is to be carried round the protruding mass at sufficient distance from the constricted part or *neck* of the protrusion to leave behind it an arc distended from tumefaction or infiltration, so that their removal will render the retraction of the gut an easy or natural voluntary effort. In making incision it may be advisable to take up, and tie with a silk ligature, any vessel met with of size enough (as some of the rectal arterial branches are) to issue a current of blood; though sometimes no such precaution is required. In the case mentioned of Mr. Gregory (to be found in 'THE VETERINARIAN,' vol. xxvi, p. 556), "not more than a quart of blood" was lost. The incision ought to be made of sufficient depth to penetrate completely through the substance of the mucous membrane, however morbidly thickened that may be, without running any risk of wounding the muscular coat beneath it; the object being to dissect the former away and strip it off the latter, so as to lessen the bulk of the mass to that degree that return becomes a voluntary and facile action of the animal himself. As soon, however, as this procedure has been carried near to the inverted anus, care must be taken not to dissect any of, or anywise injure, the sphincter of that part, lest we leave the horse with an imperfection in closing an outlet of so important a character. A soft or mash diet should for a few weeks succeed the operation; with abstinence from hay, altogether, which from its fibrous prickly nature must be particularly offensive to the denuded gut. Occasional emollient clysters are recommendable, especially when there appears any pain or difficulty in giving exit to the fæces.

HÆMORRHOIDS.

HÆMORRHOIDS or *piles*, are tumours, in general of small size, containing or discharging blood, situate within or around the verge of the anus.

So rarely have such cases appeared to have been met with, and under such dubious aspect have some of the recorded cases come to us, that but for one or two con-

tained in 'THE VETERINARIAN,' the alleged disease would not have met with a place at all in Hippopathology. Neither Blaine nor Youatt notice such a disease in horses; though the latter assures us that it is frequent enough among *dogs*. His words are—"Dogs are *very subject* to piles."¹ Among the French Veterinarian authors, Gohier and Debeaux have both described the disease; and from their works principally has Hurtrel d'Arboval copied his account of it. I have no recollection of ever having seen a horse with piles myself; but in 1852 was sent a case of "Hæmorrhoids in the Horse," to 'THE VETERINARIAN,' which will be found recorded in vol. xxv of that journal, from which I take the subjoined curtailed account:

In March, 1851, Mr. Wells, M.R.C.V.S., Norwich, was sent for in a hurry to see a carriage mare, reported to have been observed for two days before having "something bloody" hanging out of the rectum. This something was said to make its appearance two or three times a day after dunging, but had uniformly returned again of itself up to the present occasion. Mr. Wells found the mare in pain, switching or lashing her tail, and stamping with her hind feet. The case first struck him to be one of *prolapsus ani*, but "proved to be a *true case of piles*." The tumour, about the size of an egg, "presented the appearance of a pilous grape in the human subject, only, of course, much larger." Owing to the constriction of the sphincter ani around it, Mr. Wells had some difficulty in returning it; but as soon as he effected this, the mare was relieved from pain. Mr. Wells anticipated a return of the gut; nor was he deceived, for on being removed to his infirmary, and dunging, out it came again. Further examination discovered small tumours situated around and proximate to the large one; though the large one was all that protruded outside. It was returned again, and again protruded, doing so after every dunging.

Reflecting on the case, Mr. Wells foresaw trouble and difficulty about the treatment; and yet at length hit upon

¹ 'Canine Pathology,' 4th and last édition, p. 165.

a very simple one, which, so far as his knowledge afterwards went, proved effectual. He procured a pair of glove-sticks (such as used by hosiers), and gently introduced their points, oiled, about an inch or more into the rectum, underneath the tumours, which then rested upon them. Then, pressing the handles, the tumour receded with the dilatation. This he persevered in for four days, applying, at the same time, continually, cold water to the parts. In four days more the mare seemed quite recovered of her grievance. I only gave a slight aperient at first; afterwards keeping the bowels soluble with food. "The mare being sold shortly afterwards, Mr. W. lost sight of her;" so that whether there took place any return or not, he is unable to say, "but thought such an occurrence not improbable."

Another case, similar to the last, came to 'THE VETERINARIAN,' in 1849 (in the xxii vol. of which it will be found) from Mr. Collins, V.S., of the 16th, Queen's Lancers. A grey (troop) mare was sent into barracks from off the drill-ground "in consequence of the sudden appearance of a tumour, protruding from the anus, about the size of a swan's egg, of a bright scarlet colour," which Mr. Collins found to be "firmly attached to the inferior portion of the rectum, about an inch beyond the sphincter ani." Mr. Collins gave an opinion, and had the tumour examined. Three days after, there being "no alteration in the tumour," Mr. Smith, V.S., Norwich, was consulted, and an operation was determined on. On further examination, after the mare was cast, of the tumour, it was found "to be attached, for the space of three inches, to the mucous membrane of the gut, by a broad expansion of its external covering, which appeared to consist of mucous membrane of an abnormal character, separated from the healthy (portion of the membrane) by an irregular line of demarcation. It was firm and unyielding." Incision into its substance disclosed it to be filled with fibrine, "exactly resembling the fibrine of the blood." Mr. Collins carried the incision through it, "down to its root, and passed a ligature around the base of each portion." But little hemorrhage followed outwardly, though "there

was bleeding inwardly," since about three ounces of dark coagulum were found within the rectum afterwards, and removed. "As the mare rose (upon her legs) each section of the tumour dropped off." Mr. Collins dressed the places of separation with lunar caustic. Ten days after the operation the mare was discharged—no traces remaining of the disease—and went to her duty "cured."

These cases present some similarities. The subjects were both *mares*; the tumours appear to have been of the same nature, one being only of larger size somewhat than the other, and having around it a crop of smaller swellings; while its contents, in both cases, were blood; and both tumours made their appearance outside the anus. But, after all, the question is, were they, pathologically examined, true *hæmorrhoids*, or piles such as we meet with under that name in human surgery?

SECTION X.

DISEASES OF THE PERITONEUM.

PERITONITIS.

ASCITES.

PERITONITIS.

THE peritoneum is the membrane lining the cavity of the belly, and by reflection furnishing a capsule or external covering, partial or complete, to every viscus therein contained. By *peritonitis* is implied, inflammation of this membrane. Compared with many others, this is a disease which happens less frequently in horses than in men—perhaps on account of the absence of inguinal and scrotal hernia, and the comparative scarcity of operations implicating the peritoneum; as well as in some measure, owing to the opposite habits of living pursued; though, when the membrane does take on inflammation, as in men so in horses, unless injury of some sort be the cause, the chronic form is more apt to prevail than the acute.

ACUTE PERITONITIS, indeed, is in horses but a rare occurrence: almost the only well-marked cases we see of it—barring such as are occasioned by incidental injury—being those that arise from the operation of castration. Puerperal peritonitis may be looked upon as disease *sui generis*, arising from causes of a peculiar or extraordinary nature; and a disease to which neat cattle are more obnoxious than horses. I do not mean to deny that the disease may originate in the application of cold to the surface of the body while heated; in the imbibition of cold water under similar circumstances, and so forth; but I do mean to contend that such occurrences are very uncommon. It is a great deal more likely to arise from mechanical injury of some sort—from a puncture in the belly, or from overstraining the body in continued or violent acts of galloping or leaping; and this accounts for its presence in hunters that die “over-marked,”

two or three examples of which have come under my notice. Surgical operations whose performance necessarily involves or endangers the wounding of this membrane, are also likely to be followed by inflammation of it; among which, castration, for its comparative frequency, as I said before, stands foremost; though to the same list may be added the operations for strangulated hernia, stone, tapping the bladder, &c. Peritonitis, says Professor Vatel, is a serious consequence of castration; for it is rapid in its progress, difficult of arrest, and, if not arrested, almost sure to end in gangrene. It may occur in every period of convalescence, as late as the twelfth day after cutting, and even later. Its prime causer is cold.

Professor Stewart, formerly of Glasgow, met with a case which rendered it probable that the entrance of *air* into the abdomen caused it, and is inclined to consider this to be one *modus operandi* of mischief in cases operated on by the cautery rather than the clams. The professor operated on two yearling colts with the cautery. One struggled a good deal, and when he rose up, was heard "a slight gurgling noise proceeding from the scrotum." "I put my hand against the ring, and the noise instantly ceased." The colt was seized with peritonitis on the third day, and was dead on the fourth. One of the chords was found "altogether within the abdominal cavity: its sound extremity lay just at the internal opening of the ring." The professor thought himself, from this case, warranted in deducing the conclusions, that—

1. The colt will sometimes draw the spermatic chord into the abdominal cavity.
2. That a quantity of air will sometimes follow the chord.
3. That air in the cavity of the abdomen will produce peritonitis.
4. And it seems feasible that *castration by clams* is *not* likely to be followed by peritonitis.

The SYMPTOMS of acute peritonitis are many of them common to enteritis and colic, and other abdominal pains and irritations; though, if we may judge from his mode of ex-

pressing them, should say the animal's sufferings were not in general so great as in the first-mentioned two diseases. The horse paws, crouches, looks at his flank every now and then; at length lies down, and, while down, stretches himself out and groans, or else rolls upon his back; he cannot bear to lie in a posture which compresses his belly; nor will he suffer any one to press hard against his sides or abdomen without cringing and flinching, and at the same time turning round to bite at the person. The belly is distended and tympanitic; the bowels costive; the pulse small, hard, and quick; the skin dry and rough-coated; the extremities cold. In the height of the disease the respiration becomes short, quick, and painful; and he sighs in his breathing as if, in consequence of the soreness of his belly, it hurt him even to heave his flanks.

DIAGNOSIS.—Throughout their course, and in particular in the latter and more violent stage, the symptoms of peritonitis commonly bear that resemblance to those of enteritis, which renders it difficult—often impossible—to distinguish between the two diseases, unless we refer to their origin or history, and then the apparent mystery is likely to become solved at once. We must remember that peritonitis hardly ever originates in the acute form *spontaneously*; on the contrary, that, in that alleged form, it is almost invariably to be traced back to operation or mechanical injury of some sort; and this is often the only safe ground on which we can build our opinion. Hurtrel d'Arboval assures us it is frequently induced by drinking cold water while the body is heated: we may therefore take this circumstance also into our account.

The TERMINATIONS of acute peritonitis are in resolution, effusion, gangrene, and in the chronic form of the disease.

RESOLUTION, or the gradual abatement of the violence of the disease and progressive return to health, is the termination to which all our remedial efforts must be directed, although the one least likely to be brought about, unless called in quite early—before the disease has had time to develop itself, or when it has gained ascendancy enough to manifest violence.

EFFUSION of serous fluid or plastic lymph, or probably both, will be sure to ensue, should gangrene at once be produced. Added to the vascularity of the membrane, it will be here and there coated with lymph, and the surface of the bowels partaking of this, and in places perhaps glued together by it. Sometimes the effusion mostly consists in serous fluid within the cavity, in which are floating flocculi of lymph; though this is a termination more to be looked for after *chronic* peritonitis. Sometimes, after a continuation of disease, the membrane is found thickened, with adhesions between its visceral and parietal surfaces.

GANGRENE; a change made known by sudden cessation of pain and irritation, and other remarkable alterations in the symptoms, of a kind such as have already been detailed in the account of enteritis;¹ is a disease with which, in its idiopathic form, peritonitis is often associated.

TREATMENT.—When once the disease has become recognised, no time ought to be lost in bleeding the patient until the pulse at the jaw responds; and, in a violent case, in four or six hours afterwards, providing the pain and fever appear undiminished, the bloodletting may be repeated to an amount to make the same impression: for, unless this effect upon the circulatory system be produced, we do little comparative good. After two or three such evacuations as these, we must be guided entirely by circumstances—such as direct us in bloodletting in enteritis and pleurisy, and other acute inflammations; though, in truth, the further use of the phlebotomy is not often to be recommended. French veterinarians recommend the use of leeches and cupping-glasses to the belly, as means of topical bloodletting: since, however, we are in the habit of carrying the general abstraction of blood much farther than the French, I apprehend that neither of these remedies would meet our views of sufficiency; independently of the one, viz. leeches, in addition to their inefficaciousness, being very expensive; and of the other being, I should imagine, exceedingly troublesome—nay, difficult, if not impossible—to apply

¹ For an account of which turn to page 327.

in a case where acute abdominal pain was all the while distressing the animal.

After the first bloodletting, give ten drachms of aloes in solution or decoction.¹ Flannels wrung out from water as hot as it is possible to bear the hand in, continually applied to the belly, will contribute much to soothe and abate pain. Steaming the belly by suspending bags of hay dipped in boiling water underneath it, is practised by the French veterinarians. I prefer, myself, the application of a blister to any fomentation. Five or six hours after the exhibition of the drench we may commence giving aloetic clysters: raking, first of all, to remove any sybala, should such appear necessary; in fact, doing all we can to promote the operation of the cathartic. Rowels and setons are of no use whatever. From what has been said, it will be seen, there is no important difference between the treatment of peritonitis and that of enteritis; so that, for any further information that may be required, the reader may confidently turn to the account of the latter.

CHRONIC PERITONITIS may prove the sequel, or termination, as it is sometimes called, of the acute form of the disease; though, as far as my experience has gone, I hold it to be much oftener an idiopathic disease—frequently a concomitant of inflammation of other serous membranes, in particular the pleura. The serous membranes all fall into disease simultaneously, and exhibit a morbid sympathy for each other—the peritoneum for the pleura, the pleura for the peritoneum; the membranes of the brain, internal as well as external, for both. A horse, from his third to his fifth year, “catches cold,” catarrh follows, bronchitis comes on, pleurisy ensues, peritonitis and ascites prove consequent, and the membranes of the brain probably participate. There is prevailing in the system a *dropsical diathesis*, a disposition in every serous structure, cellular tissue as well, to effusion, and the animal probably dies “of the dropsy;” a disease which has been very likely induced by debility, either constitutional with

¹ The decoction should be kept in every pharmacy ready for use. The formula for preparing it will be found at page 321.

the animal, or else engendered in his constitution by depletion carried too far in the treatment of the case in its early stage. The little pain and disturbance the chronic disease is apt to create in its incipient stage renders it difficult of detection; though occasionally, and especially when it comes to be more advanced and attended with certain consequences, what are called—

“SYMPTOMS OF ABDOMINAL IRRITATION” will make their appearance, and give us reason to suspect, and probably detect, its presence. These are—occasional pawing, or lifting up his legs to his belly, but not with urgency; sometimes lying down upon one side at full length, and, while down, now and then raising the head towards the belly, and groaning; tenderness expressed when the abdomen is touched; flanks drawn in; respiration quickened, which will in some cases come on in paroxysms; pulse small and frequent; bowels constipated, or else unusually relaxed; crouching under weight or pressure upon the back; an awkward gait of the hind quarters in walking.

TERMINATION.—The tendency of chronic peritoneal inflammation is to effusion of serous fluid, and, along with it, more or less lymph matter, into the cavity of the belly, a morbid state hardly more remediable than hydrothorax: it therefore behoves us to obtain the earliest information possible of the presence of such an inflammation, and when once we have attacked it, not to cease or even slacken our counter-active measures, until we appear to have set our patient out of all danger of internal effusion.

TREATMENT.—Frequent small bloodlettings—about three quarts, or even but three pints, every two, three, or four days, according to the condition and strength of the patient, as well as the actual state of his symptoms. Mild but continued doses of aloes and calomel, in combination with Venice turpentine or resin, soft soap, nitre, the spirit. æther. nitric., with acet. scillæ and liquor ammon., may be alternated with other tonic diuretics. Blisters to the belly. Rowels in both chest and belly, and setons along the sides of the abdomen. Walking exercise, according as the strength and

state of the patient will admit it, must be judiciously enforced.

ASCITES.¹

ASCITES, or dropsy of the abdomen, is what we have to apprehend when peritonitis, assuming the chronic form, continues long unchecked, or unsusceptible of arrest; though it is a disease, it must be understood, which may proceed from other causes as well as inflammation. Consentaneous sympathy, a dropsical diathesis, and disease of certain important organs—the liver, kidneys, and in an especial manner, the lungs—are all influential in the production of ascites: all tending either to an augmentation of the natural secretion of the membrane, or else to the effusion of a fluid which, though serous, possesses properties different from that exhaled in health.

The SYMPTOMS denoting a collection of water in the belly are—œdema, or dropsical effusions in other parts, in the sheath and underneath the belly in particular: a symptom, occurring under suspicious circumstances, worthy a good deal of attention, especially when with entire absence of any filling in the legs (see case, B 27, in ‘Record,’ p. 190); though the legs are apt to swell as well, if not at first, towards the conclusion. There is dropping and actual enlargement of the belly, fluctuation, and, on percussion, a dull obtuse sound, different from a state of health; shrinking, or sense of tenderness whenever the belly is pressed, or weight is imposed upon the back; perhaps something awkward to be perceived in the gait of the hind legs in walking; at one time dull and dejected, at another roused into action by an attack of enteritic symptoms; quickened respiration, which sometimes comes on in fits; lying down at full length, and looking up or back at the belly, and sighing or groaning; pulse small and frequent; bowels at one time costive, at another relaxed; appetite, though at first not to be complained of, failing in the latter stages.

CAUSES.—Ascites is very apt to be associated with hydro-

¹ See case of ascites, by Woodger, in ‘THE VETERINARIAN’ for November, 1846.

thorax. Now and then it will supervene upon one of those anasarca attacks—swelled legs, &c., to which young horses are so prone during spring and fall. At other times it supervenes upon a thoracic attack (the accompaniment or not of “influenza”), perhaps even weeks after, the horse has been discharged and deemed to be “cured.” It may arise from disease of some of the viscera, the peritoneum being connected with almost all of them; or it may have its origin in the venous circulation, which in the abdomen is free but weak, and naturally unobstructed; hepatic disease may induce it: diarrhoea will have such an effect in the end; disease of the kidneys, &c. Now and then, after death we meet with the disease where no symptoms preceded to indicate it, and where its presence was least suspected, in a passive form, and as such gives perhaps no other indication of its existence than towards the end some filling of the legs. Disease of some of the abdominal viscera, the intestines especially, will now and then exist, and puzzle us to find out what is amiss with the horse until the very last, when the peritoneum sympathising with the diseased irritation going on, takes on increased action, the result of which is effusion in the form of *ascites*, when enteritic symptoms supervene, in which the animal dies. Now and then it happens, in the mare, that one or both ovaries are the seat of disease, and ascites follows; but then, in this case, the dropsy becomes *encysted*. I have already shown its connexion with peritonitis: a case in which the symptoms will partake more of the colic or enteritic character than in such as we may denominate cases of *pure* dropsy.

ASCITES PROVES CONSECUTIVE OF PLEURISY. One serous texture after another becomes a prey to the spreading inflammatory diathesis; and while in one place it runs so high that lymph and pus are produced, in another; secondarily, and more mildly affected, the inflammatory action expends itself in the effusion of water. In one case, the cellular tissue—the external serous tissues—are especially affected; in another, the inflammation attacks most violently the *serous membranes* or internal tissues; while, in a third in-

stance, *both* become the subjects of disease, and it is difficult to say which is attacked first or suffers most.

DROPSY FROM DEBILITY.—The same dropsies may be engendered apart from inflammation—in apparent connexion, indeed, with *debility*: a practical fact to which our attention has been particularly drawn by Mr. Brown, V.S., Melton Mowbray, who has given an excellent paper on the subject to ‘THE VETERINARIAN’ for 1832, from which I shall here cull some extracts:

SPONTANEOUS ANASARCA—the name Mr. Brown has given to this form of the disease—usually attacks, he says, one and two-year old colts grazing during the winter season in wet, poor, moory land, which accounts for its prevalence in Lincolnshire. With a view of preventing it, it is the custom there to take such colts up for the month of August, and feed them during the time, exclusively, on dry provender. The first symptoms of the disease are—swellings of the legs, sheath, belly, and lips, and, finally, the eyelids; such tumefactions being soft and pitting, but not very sensitive. The breath and excretions manifest a peculiar odour. The animal turns sluggish and depressed; loathes his food; seldom lies down: his respiration becomes accelerated; his pulse feeble. To these primary symptoms succeed loss of flesh and prostration of strength; short and difficult respiration, with frequent and indistinct pulse; diarrhœa: which last, once established, carries the animal off in despite of all remedy.

The TREATMENT pursued by Mr. Brown is, to take the colt up, and give him a roomy box to run in; to scarify his swellings, and foment them either with simple water or a decoction of oak-bark—the sheath being supported all the while by suspension from the loins; or stimulate them with embrocations or blisters; and to exhibit internally vegetable tonics combined with diuretics, and allow a liberal diet. Should the bowels become constipated, small doses of aloes may be given; otherwise, both purging and bloodletting, Mr. Brown assures us, are “contra-indicated.” We should feel inclined to doubt the policy of refusing to set such influen-

tial emunctories to work as the kidneys; in fact, on the contrary, this is just such a case in which we should give the Plummer's ball.

The POST-MORTEM APPEARANCES have turned out to be—yellowness and laxity of the muscular fibre; effusion into the cellular membrane; thickening of the pericardium and pleura, with effusion almost to the amount to collapse the lungs and arrest the heart's action; effusion into the omentum, mesentery, peritoneum. In one, and but one, subject, the kidneys were become disorganised.

The ASTHENIC OR PASSIVE FORM OF ASCITES is that in which we are most likely to be deceived by this disease. When anything of the kind, from preceding and continued ill-health, or from unthriving ill-conditioned state of body, is apprehended, we must view with suspicion such symptoms as "swellings of an œdematous character, coming first under the throat, and afterwards in the scrotum and subabdominal cellular tissue," the legs, &c. A highly buffed condition of blood is likewise symptomatic of the ascitic state. In these cases, however, enteritic symptoms come on before death; although the animal, with disease of chronic nature going on within the abdominal cavity, has been all along without any positive illness until such symptoms do actually make their eruption.

DIAGNOSTIC.—But a few years ago, veterinarians in England would have ridiculed the idea of naming even such a thing as a diagnostic for the "obscure" and then hardly-known disease we are here considering. Experience, however, has since taught us that we may with some confidence regard the external dropsy, the enlarged and fluctuating belly, the peculiar dull sounds elicited by percussion, together with other corroboratory signs and circumstances, as pretty reliable tests of its presence.

The PROGNOSTIC must be such as to create alarm; though instances of recovery be recorded, they are seemingly but incidental, and too rare to afford us any ground for calculating on any addition to them.

Mr. Cartwright relates a case he considered to be one of

ascites—though evidently complicated with “farcy humours”—which was, after great perseverance in small bloodlettings, aperient and diuretic medicine, and counter-irritants, completely recovered. Scruple doses of cantharides were occasionally given also with apparent advantage.

The POST-MORTEM APPEARANCES consist in the presence of an aqueous fluid in the cavity of the belly, accompanied by congestion in the peritoneum, or, more likely, with alterations in its structure. In general, the effused fluid is of a bright yellow colour, perfectly pellucid, and altogether similar in its aspect to the serum of the blood; though at times it is almost as colourless as water: in fact, it is evidently of the same description as that found in pleurisy. In one case, where blood was found in the cavity, Mr. Cartwright saw it looking like “pale port wine.” Its quantity will vary considerably: sometimes its amount is but comparatively small; while in other cases it is very great. Mr. Hodgson met with an instance in which the fluid amounted to “four stable-pailfuls—about sixteen gallons.” I have seen the cellular tissue of the mesentery and mesocolon loaded with the same fluid. I have also met with a case in which the cellular tissue connecting the muscular to the vascular coat of the stomach was filled to that degree, that one tunic was not only completely but widely separated from the other. Now and then flocculi of coagulable lymph are found in various places, adhering to the surfaces of the intestines, while loose portions are floating about in the water, giving the turbid whey-like appearance. The peritoneum is either not perceptibly altered in its aspect and texture, or exhibits a general and more or less intense reddening; or else is reddened in patches. In inveterate cases, losing its shining character, it turns opaque and white, and becomes more or less thickened in substance. Of the abdominal viscera, the kidneys seem the most subject to morbid alteration in these cases: I have occasionally found them pale, unusually tough in their texture, with purulent matter in their pelves. Mr. Brown (of Melton) met in one case with “purulent mucus” in the pelvis, with ulceration of its surface.

But in the mare we may have what is called

OVARIAN DROPSY : a state truly *encysted* at first, should it turn out to be destitute of sac afterwards. In this you may have in the latter stages symptoms of pain, as in general ascites ; but the tumefaction of belly will not be general or uniform, but confined to (or most prominent in) the regions of the ovaries, on one side in particular or not, as the enlargement proceeds from one or both of them. The case following, though one unattested by name, extracted from 'The Scottish Farmer,' appears to have been a diseased and enlarged ovary.

A black mare, ten years old, was observed to be unwell for several days, when at length dropsy was suspected. She was carefully examined for such. Along with febrile symptoms, her belly was found large, and there was fluctuation perceptible on lateral pressure. Examination, *per rectum*, discovered a large tumour "adherent to the internal wall of the abdomen, in the left lumbar region, its upper border being about as high as the points of the transverse spines of the lumbar vertebræ ; whilst its lower, which was an irregular outline, seemed to hang loose within the belly. The bulk of the tumour occupying the region of the side, its anterior edge could not be reached by the hand thus introduced ; but the size was apparently about that of a human head, while its structure seemed dense and compact, with a slight pulsation here and there on its surface. The presence of fluid was with certainty ascertained, by its resistance to the hand, when introduced to the extent of the arm up the rectum."

POST-MORTEM.—"On opening the abdomen, about fifteen or sixteen gallons of reddish liquid flowed out, having no ill smell, nor any flaky matter in it." The tumour was covered with a strong tissue of peritoneum : the irregular outline of edge mentioned being found to be owing to a number of small swellings adherent to it. The tumour, detached, weighed 35lb., and consisted of two kinds of texture ; one of which, the outer, was encephaloid, and gradually merged into another, the inner, consisting of "reddish-grey fibrous matter."

At the supra-posterior part of the diaphragm there was another large tumour, or rather the remains of one, for it had burst and discharged its contents, which were fluid—in fact, such as constituted the dropsy. This tumour, entire, weighed from 60 to 100lb. “The whole of the *tumorous* matter, when dissected, amounted to 138lb., which, added to at least 150 or 160lb. of fluid, made 300lb. of diseased matter within the cavity.” *Vide* ‘*VETERINARIAN*,’ vol. xxii, p. 653.

The TREATMENT of ascites, so far as it involves the constitution, must be conducted either upon a plan of depletion or of support, or else upon a judicious combination of both modes of procedure. Unless we be able in our own mind to unravel the pathology of the case—to ascertain whether it be a primitive or secondary affection, a local or constitutional one, we are not likely to arrive at much success in practice. The majority of cases will be found to combine fever or inflammation in their nature, and consequently require depletives. Bloodlettings, small but often repeated; purges, mild but continued, in combination with diuretic and sedative medicine: the plan I found the best to proceed upon, is this: I give, as a cathartic, to begin with, my purgo-diuretic ball, consisting of equal parts (half ounces) of cathartic and diuretic mass, repeating it once in the course of twenty-four hours, which will probably be required—or even twice, if found necessary; after the action of which I commence with the Plummer’s ball, (formula for which will be found at page 277,) which I give twice, or even, if requisite, thrice a day, and persevere with until the mouth, or rather the breath, denotes that mercury has entered the system. Cantharides, as a potent diuretic, is recommended by some practitioners; but, for my own part, I prefer the Plummer’s ball to using this as a diuretic, and indeed augmenting all the secretions; added to which, it is a potent and influential alterative or restorer of healthy action.

The EXTERNAL SWELLINGS are to be regarded rather in a favorable light than otherwise: any sudden or rapid dis-

appearance of them would be enough to create alarm, for fear of its augmenting the internal dropsy ; at the same time it may and often does happen that these outward tumefactions increase to that degree to occasion inconvenience, and even alarm, in consequence of their volume. With a view of diminishing them, and relieving their distension and weight, the readiest practice is to scarify their most prominent or most dependent parts with a broad-shouldered bleeding or abscess lancet ; and to encourage the serous issue that follows, as well as any hæmorrhage which may be produced, by fomentation, long and perseveringly persisted in. These scarifications may be repeated once, or even twice a day, should the tumefaction be such as to call for the repetition.

WALKING EXERCISE in hand is not only advisable, but even absolutely indispensable, providing the strength and condition of the patient be equal to it, and with the understanding that the state of the disease itself do not forbid it.

TONICS.—There will arrive, in most cases, a period or stage of the disease in which we shall find it not only inadvisable to carry depletion—bloodletting and purging—farther ; but even to substitute the use of tonics, not merely with a view of recruiting the strength of our patient, but to enable his absorbent system to remove the remaining effused fluid. It is not easy in practice to determine the critical period—when we ought to substitute one mode of treatment for an opposite one : every circumstance connected with the constitutional state and condition of the animal, together with the stage the disease is in, must be taken into account, and with that the progressive effects, beneficial or otherwise, we may have already seen under similar circumstances resulting from depletion ; and from a careful consideration of the whole of these circumstances put together, we must shape our future plan of procedure. Mr. Brown has shown us cases of a description in which tonics are recommendable, even from the very outset. Now, there are many medicines we call tonics ; though, should they all prove so, it would seem, (so different is their nature) to be impossible they can all operate on the system in the same manner. We have vege-

table tonics and mineral tonics: some practitioners preferring one kind, some the other; while some veterinary surgeons there are who in practice combine the two. All practitioners concur in the advantage of including diuretic medicine in the formula. Either of the following balls may be administered daily; with this proviso—that the bowels, during the time, be kept from becoming constipated, either by clysters or by occasional doses of aloes.

TONIC-DIURETIC BALLS.

<i>Vegetable Tonic.</i>	<i>Mineral Tonic.</i>
R Pulv. Cinchonæ, ʒss;	R Ferri Sulphat., ʒiss;
— Quinæ, ʒj;	Pulv. Gentian., ʒij;
— Gentian., ʒij;	Syrup. Zinziberis, q. s. ut f. Bol.
— Zinziberis, ʒj;	
Terebinthinæ, q. s. ut f. Bol.	

Mr. Brown uses balsam of copaiba, substituting it for, or mixing it in equal parts with, the Venice turpentine. Mr. Cartwright prescribes cantharides with the same view, viz., to excite diuresis: they may be added, in the proportion of five or ten grains of the powder, to either of the above balls.

Wm. L. Sullivan
 Surgeon
 Cincinnati 1856

SECTION XIII.

DISEASES OF THE LIVER AND SPLEEN.

ACUTE HEPATITIS.
 HEPATO-PERITONITIS.
 COMPLICATED HEPATITIS.
 CHRONIC HEPATITIS.
 JAUNDICE.
 RUPTURE.
 WORMS.
 HYDATIDS.

BILIARY CALCULI.
 SPLENITIS.
 HYPERTROPHY.
 OSSIFICATION.
 RUPTURE.
 CARCINOMA.
 MELANOSIS.

PRELIMINARY OBSERVATIONS.

AWARE of the connexion between the mechanism and economy of these two glands, it is not unnatural to suppose that some sort of sympathy should be found to subsist between them under disease: indeed, the coincidence is acknowledged by Hurtrel d'Arboval, and likewise seems to have received the assent of Volpi, whose arrangement I have followed in the present Section. Few and infrequent, however, as their diseases are, and limited as our present knowledge is concerning them, this is a point I hardly dare insist upon.

The LIVER, a part often diseased in men, is but seldom so in horses. Professor Coleman, in his Lectures, has adduced as one reason for this, the complication of the biliary apparatus in man, and its comparative simplicity in the horse: the latter having no gall-bladder. Hurtrel d'Arboval takes another view of the subject, and ascribes the difference to the little cellular tissue entering into the composition of the horse's liver. May we not also take into the account, the absence of causes in respect to horses which are known to produce bilious disorders in men? to wit, intemperance in living, passions of the mind, sedentary habits, &c.? Hot climates are well known causes of these complaints in men; and, from an account of Transactions at

the Veterinary School, established by M. Hamont, at Abou-Zabel, in Egypt, climate would appear to be likewise influential in their production among horses¹. Added to their infrequency, diseases of the liver are, with one or two notable exceptions, so obscurely marked in horses, as to be either exceeding difficult of detection during life, or else to pass on totally unobserved until after death. Frequently, in the course of our post-mortem examinations, do we meet with the liver in a diseased, nay, even disorganized condition, without any suspicions having been entertained during life of the gland being in a morbid state. Other instances occur of hepatic being mistaken for pulmonic disease.

HEPATITIS.

WE use the word *hepatitis*, to denote an inflammation either of the *capsule* of the liver, or of its internal substance or *parenchyma*. In fact, inflammation may attack the capsule, and thereto principally confine its action, or it may originate in and ravage the interior of the gland. Furthermore, in respect to the part in which it is seated, it may be either *partial* or *general*; and in respect to its character, *acute* or *chronic*.

ACUTE HEPATITIS.—In the present instance we may take the epithet *acute* to imply that form of disease which, from its activity or intensity, is clearly recognisable in practice, in opposition to other forms which present no marks whatever, or but very vague and indistinct ones, of their existence. The pain the animal must feel, even in the acute disease, is but of an indefinite character; while in the chronic, it is but rarely we are able to detect any sign of pain whatever, or even indeed apparent inconvenience.

SYMPTOMS.—The horse is perceived to have become dull, inactive, moping, and probably to cough occasionally: he has a heavy head, a drooping lustreless eye, loathes his food, and evidently feels unwell. He seems as though he were

¹ An official report of this is contained in 'The Veterinarian,' for 1839.

suffering some inward pain ; but it is manifestly not of an acute kind. He has not lain down during the past night ; his dung-balls are small and unusually dark-coloured ; his bowels constipated ; his urinary discharges scanty ; and there exists a great deal of fever in the system. The fever runs on, and commonly, on the second or third day after its onset, turns out to be what farriers call “ the yellows ;” recognised by them as such from the remarkable circumstance of the mouth and eyes having assumed that colour. The inner surfaces of the lips and cheeks, the tongue, the conjunctive membrane, and, in some cases, the transparent cornea and iris as well, turn yellow, indicating the diffusion of bile over system ; and the same is further demonstrated by the deep golden dye of the serum of the blood. I have likewise observed yellow matters floating about in the aqueous humour. The dung-balls are deeply imbued with bile ; and in some cases enveloped in a viscid, bilious mucous matter as well : their colour is that of a reddish-brown, leaving, when rubbed upon white paper, much the same stain as solid opium would. If any urine be caught, it will be found to be thick, to exhibit the same bilious tinge, and to deposit, on standing, a copious lateritious sediment. The horse will probably be found lying down quietly, and not appear easy ; though from time to time turns a dolorous look at his side, and soon after rises up again : he will probably be discovered lying upon his left side, and should the right be pressed against, he will flinch or bite, or otherwise express tenderness there. Hurtrel d’Arboval, indeed, speaks of heat and tumefaction of this side. When standing, now and then he is found pointing or favoring one (the off) fore limb. The pulse becomes quick, strong, and bounding. The breathing is disturbed in some cases ; in others tranquil. From being simply dull and heavy, the animal turns sometimes quite stupid ; at times indeed vertiginous, so that he staggers in his walk, and is unsteady even in his stall. In this state, should no relief be afforded him, the patient is in danger of apoplexy on the one hand, and, on the other, of bursting his liver.

LAMENESS OF THE FORE LEG, in hepatitis, has been observed both by English and French veterinarians,—“Cè, qui est remarquable,” says D’Arboval, “il boite quelquefois *du membre antérieur droit*, ce qui semble indiquer que la douleur s’étend jusqu’à l’épaule, comme dans l’homme.” The most interesting case I am acquainted with of this description—one that bears striking analogy to the pain referred to the right shoulder in human medicine—is the following:—

The horse belonged to the Royal Artillery, at Woolwich, and was lame in the off fore leg, through which ultimately he became disabled to that degree that he with difficulty projected the limb even in walking. No cause whatever being discoverable, and the lameness continuing in defiance of all that had been done by way of remedy, it was deemed advisable to destroy the animal. The limb was dissected; but every part appeared healthy. His body was then opened, and, strange to say, a thorn of considerable length was found sticking in the substance of the liver.

In the ‘VETERINARIAN,’ for 1847, p. 73, is related a case, by Mr. W. Smith, V.S. Epsom, in which the lameness appeared in the *near* instead of the off or right fore leg. The subject was a cart colt whom Mr. Smith attended on account of a “slight attack of fever,” with a little “soreness of his sides.” He proved to be lame in the near fore leg, evidently in the shoulder from his action, but nothing could be discovered to account for the lameness. Nothing proving of any avail, and the lameness increasing, after four months he was destroyed. The limb, examined in every part after death, was found perfectly normal, as were the contents of the chest and abdomen, with the exception of the liver, which “was diminished in bulk nearly one half, but much increased in density, and studded throughout with small cartilaginous bodies, which, from their shape, might be called asteroids, being full of points very much resembling stars. They were so hard, that I at first thought they were osseous, but succeeded after some time in deciding on their *cartilaginous* nature.”

SPASMODIC AFFECTIONS of the shoulder, side, &c., have

been occasionally seen, as though connected with the hepatic nervous system.

The CAUSES of hepatitis are not in all cases demonstrable. We may probably set forth *plethora* and excessive *stimulation* of system as the two most general ones: over-feeding and over-exertion, particularly during hot weather; even simple exposure to heat in a climate where the sun has more power than in our own, may, likely enough, in the course of time, produce the disease. It has been remarked that stall-fed oxen become the occasional subjects of hepatic disease, which is strikingly manifested after death by a yellowness of the fat of the carcass: in this instance, excess of aliment, with the want of exercise, would appear to be the cause. In like manner, horses who have been little or not at all exercised, and are kept fed up, are liable to such attacks. In consonance with all this, comes the observation of Mr. Brown, V.S., Melton Mowbray, "that hunters who are kept in the stable during the summer months are frequently attacked with hepatitis, which," he adds, "may probably arise from their being too liberally fed, and a want of sufficient exercise." To these causes may be added, injuries of the right side, or of the liver itself; gall-stones; worms in the biliary passages; inflammation of parts connected with or in the immediate vicinity of the liver, &c.

The TERMINATION of hepatitis, under ordinary circumstances is, generally speaking, favorable; the disease being one that, though tardily, pretty surely gives way to timely bleeding and purging, two remedies which are of pretty universal adoption among farriers and grooms, for "yellows." The greatest danger to be apprehended, particularly in cases where these evacuations are delayed, is bursting of the liver from over distension: the gland being at the instant gorged, not with blood alone, but with bile also; though this danger will much depend on the condition of the liver, sound or unsound, at the time of the inflammatory attack. Even the brain is far from being out of danger, so long as the liver continues in a state of congestion: adding one more cogent reason for the immediate employment of evacuants. Judging

from analogy, and from all we are able to observe in practice, there is every reason to believe that acute hepatitis not unfrequently ends in the *chronic* form of disease.

PROGNOSTIC.—An evident amendment, as soon as the purgative has come into full operation, or speedily afterwards, may be taken as an earnest of a favorable termination: should that and the fleam fail to give relief, there will be cause for alarm.

The TREATMENT required is simple. In the first instance from four to six quarts of blood ought to be abstracted; and this evacuation be immediately followed up by the exhibition of ten drachms of purging mass in a ball, or twelve drachms in solution: the whole operation may be accelerated by the timely administration of a clyster. Calomel, and indeed every other preparation of mercury, being a stimulant to the liver, is to be scrupulously avoided. As soon as we perceive the physic to be setting, should there be occasion for it, we may take away another gallon of blood; and, at the same time—after having had the hair shorn off—apply a blister to the right side, extending it from the borders of the ribs as far forwards as the place of girthing. The first dose of medicine once set, we may resume our operation on the bowels, giving every other day the following ball, omitting it only at such times as purgation shall have re-commenced:

Take of Purging mass	ʒiiss;
— Powdered nitre	ʒiiiss;
— Soft soap	sufficient for a ball.	

Should the blister not have taken proper effect twelve hours after its application, it may be repeated. In case the disease appear to be merging into the chronic form, the insertion of two or three setons through the skin of the right side is very commendable practice.

HEPATO-PERITONITIS—an appellation which will serve to denote inflammation of the *peritoneal* covering or capsule of the liver—is a disease of whose occasional existence post-mortem examinations furnish us with sufficient

evidence, though one whose presence we are not, perhaps, at this moment, in a situation to demonstrate during life. I have, in the course of my dissections, found the membrane in question variously altered in texture—its shining transparency turned into opacity and dead whiteness; its substance thickened; its surface studded with tubercular eminences; strong adhesions contracted between it and the diaphragmatic expansion of the peritoneum. According to Hurtrel d'Arboval, hepato-peritonitis only occurs in conjunction with hepatitis or inflammation of the *substance* of the liver existing either as a cause or effect: I cannot, however, agree with him, having from dissection received sufficient proof to the contrary.

SYMPTOMS.—The expression of pain will probably be more decided in this than in any other form of hepatic disease. The respiration is likely also to be more disturbed; so much so as, without other collateral signs, to render the disease liable to be confounded with pneumonia or pleurisy. There will probably be likewise more fever in the system: the pulse evincing greater quickness, and being rather contracted than full and bounding.

Our **DIAGNOSTIC**, however, must, after all, be founded chiefly upon local symptoms, or such as have a more direct reference to the liver; such as tenderness or manifest heat of the right side; any indication of lameness or appearance of spasm; and any appearance of bile in the system, or of the redundancy or deficiency of it in the excretions—the dung and urine.

The **TREATMENT** will be the same—allowing for any additional activity that may be required in the use of the fleam—as that prescribed for acute hepatitis.

COMPLICATED HEPATITIS.—Of this disease, of my own personal experience, I pretend to no knowledge whatever: I am wholly indebted for what I am about to offer on the subject to Hurtrel d'Arboval.

This writer informs that among the complicated forms of hepatitis, the best known is that in which the appendices and tendinous portions of the diaphragm are involved with

the liver in inflammation; though he acknowledges it a very embarrassing question to decide whether the *paraphrenitis* be primitive or secondary. In either case the malady has received the name of *mal de feu ou d'Espagne*, probably from its prevalence in that country. During a campaign it will attack numbers of military horses at the same time, and assume quite a formidable aspect. There will be high fever; sharp pain at the bottom of the chest, particularly during inspiration; orthopnœa; depression; despondency. The horse hangs his head low; heedlessly throws himself about; strikes the ground with his fore feet; shakes himself: dashes his head about; bites at every thing around him; often regards his flank; tears pieces even out of his own body; rears himself into the manger, and seizes with his teeth the bars of the rack, and thus maintains himself. In some cases the conjunctive membranes turn faintly yellow. This dreaded malady almost invariably ends in death.

The TREATMENT consists in prompt and copious blood-lettings; in the application of blisters to the temples as well as to the region of the liver: also of ice or cold lotions to the head; and in the administration of such medicines internally as are acknowledged antiphlogistics.

CHRONIC HEPATITIS.—Although the dissection of dead horses furnishes us with ample evidence of the occasional existence of inflammation of the liver in a *chronic* form, still it is a disease whose presence during life is apt to be veiled in much obscurity; if not, indeed, passed over altogether unobserved.

SOFTENING of the substance of the liver is a change by no means uncommon, and one which we believe to be consequent on inflammation; and yet we seldom obtain any knowledge of the disease until after death. The liver is found paler than ordinary—clay-coloured, and evidently contains an inordinate quantity of bile; at the same time it is so soft (or “rotten,” as the farriers express it) in its texture that but slight force is required to thrust the finger through its substance.

INDURATION or SCHIRRUS is another species of disorganization to which the liver is subject, and insomuch as regards the firmness of substance of the gland, one of a nature directly the contrary of the former. The liver, maintaining its normal colour, feels firm, tough, leathery, alias *schirrous*, as we technically term it; and is, interiorly, in an evident state of condensation and vascular obliteration. This morbid alteration I believe to consist in the formation and subsequent spreading and coalition of

TUBERCLES.—Next to the lungs, the liver appears to be the most frequent seat of these formations. When present, the surface of the gland feels uneven or *tubercular* to the fingers: a circumstance explained the moment its substance is cut into, by the exposition of various globular masses of grayish or yellowish matter, which we recognise as *tubercles*; though we are, in a general way, incapable of detecting their existence during life, and almost as much in the dark in regard to their nature and origin when we have discovered them.

The observant Mr. Abernethy, speaking of these formations,—remarks, “There are certain organs which, under diseased action, seem to produce but one, or scarcely anything else but one, kind of morbid structure. It is an infusion of something into the interstitial parts, in larger or smaller masses, and this we call *tubercles*. The newly-formed matter, however, may be so extensively deposited that solidity is given to the whole, in which case it constitutes *schirrus*. To use the language of Mr. Hunter, however, tubercles are to be considered rather a disease *in* than *of* a part; for, notwithstanding their presence, the gland will secrete bile: indeed, livers may be greatly diseased, and yet make very good bile. I have seen numerous instances of it.”

SUPPURATION or ABSCESS of the liver I believe to be very uncommon; at least, it has proved so in my practice. The origin of it appears to be, the same as in the lungs, suppurated tubercles; though abscess may and will be very likely to arise from mechanical injury.

Abscess of the liver must be regarded, in any case, as an extraordinary occurrence among horses; though, when it does occur and attains any large size, it is possible, and not improbable, it may give rise to tumour, even of considerable dimension, in the region of the right hypochondrium, and umbilicus as well, perhaps. Mr. Kay's attention was called to a two-year old filly having a large swelling in the right hypochondriac region, measuring twelve inches antero-posterior diameter, by eight inches across. It appears she had been some time ago in the breaker's hands, and had sustained falls, and perhaps injury from them. After some treatment, the swelling burst, and discharged "a great deal of pus." This was followed by her gradual decline, until at length she died, reduced, "under the usual symptoms of *anæmia*. After death, sinuses were found underneath the skin, leading to a large abscess, which had burst, and deluged the intestines with pus and sanies, in addition to which there was a smaller one in the left kidney."

The late Mr. Field mentions a case of a horse who died with certain marked though anomalous symptoms, whose liver after death was "extremely high-coloured and in some parts tumid," and exhibited "throughout its substance collections of pus from the size of a pea to that of a hen's egg. These collections did not form at regular distances, but had more or less of the substance of the liver between them."¹

The same author mentions another case, in which "the liver was full of vomicæ, superficial as well as deep-seated," of a pony who died of symptoms of "croup."² General abscess often commences in this way.

ASCITES may prove a sequel of disease of the liver. A case happily illustrative of this connection is detailed in 'THE VETERINARIAN' for 1832, by Mr. Hales:

On the 3d February, 1832, Mr. Hales was called to attend a hunter, the property of R. M. Biddulph, Esq. M.P. He found the animal, a mare thirteen years old, much reduced in condition and very unwell; the membranes of her

¹ 'Posthumous Veterinary Records,' p. 107.

² *Ibid.*, p. 235.

mouth, nose, and eyes of a pale yellow colour; her body constipated; pulse 50; appetite all but lost; had been bled so lately as three days ago. Under the fullest conviction that the liver was diseased, Mr. Hales ordered small doses of aloes and calomel, with sulphate of potash. But one ball had been given when purging came on; which, however, ceased, notwithstanding that the medicine was continued. The yellowness of the membranes gradually disappeared; while one day the mare was better, another day worse: thus continuing to fluctuate until the 29th March, the day she died. For some days previous to death, Mr. Hales suspected the presence of water, but was without any signs to determine his prognosis. On being opened, the belly was found to contain several gallons of a red serous fluid. The peritoneum was thickened, and exhibited a black hue, as also did the external tunics of the colon and cæcum, which were even, in parts, "granulated." The liver was very much enlarged. Its peritoneal covering could easily be stripped off; while its internal structure "was broken down and destroyed," having the appearance of "broken-up coagula, interspersed with streaks of pus;" indeed, "no vestige of its natural structure remained."

TREATMENT.—Aware how gradually and insidiously these chronic affections of the liver steal on; how little inconvenience—to say nothing about pain—they are apt to cause the animal; and consequently, how remote and uncertain the chance is of our obtaining any knowledge of their existence; we cannot expect, at least in private practice, that they will often come under our notice; and when they happen so to do, we may anticipate there will be but too much reason to apprehend that they may have passed that limit beyond which they are without the pale of remedy. However, early or late, it becomes our duty to endeavour to act against what is but too evidently "consuming the vitals" of our patient. Should there be febrile symptoms present, and our patient yet strong enough to bear depletion, we shall do right in abstracting blood; not, however, to a large amount; for, remember always, *small and repeated blood-lettings* are, even from the very out-

set, of more avail in *chronic diseases* in general than large evacuations. Purgation, briskly excited and kept up, is more likely to prove beneficial during the inflammatory stage than any thing I know of; but on no account during inflammation is calomel to be administered: the liver is already in a state of over-excitement; and, if we believe that mercury exerts any action upon the organ, surely its use in this condition of the gland must be clearly counter-indicated. Where we suspect an enlarged, or a tuberculous, or scirrhus condition of the gland, we have some prospect of doing good by having recourse to the exhibition of iodine, both in the form of ball and of ointment. Blisters and setons may also be brought to our aid, the same as if the case were one of acute hepatitis.

JAUNDICE.

The remarkable yellowness of the skin, eyes, and mouth, in this disorder, obtained for it among the farriers of old the name of *yellows*; by whom—owing apparently to their confounding with it affections of the lungs—jaundice was imagined to be of very common occurrence. In truth, however, it is comparatively but a rare disease. And when present, is, in the generality of cases, if not in all, symptomatic of hepatitis, either of the acute or chronic character. Independently of the consideration of the general absence of other causes for jaundice, this is an opinion we are naturally led to adopt from fever being a concomitant of the disorder, as well as from the circumstance of its yielding to copious evacuations, more particularly to bleeding and purging.

The SYMPTOMS, then, of jaundice will be those of hepatitis. Those especially characteristic are, yellowness of the eyes, nose, mouth, and skin, wherever it can be perceived, accompanied with saffron-coloured urine and serum of the blood, and with dung either of the same bilious tinge, or else altogether devoid of bile—clay-coloured.

PATHOLOGY.—I repeat, I believe jaundice in horses commonly to result from hepatitis: I do not mean, however, in

asserting this, to deny that it may have other origins. Authors tell us that it may originate in obstructions in the biliary duct, occasioned by gall-stones, stricture, &c. ; though into this opinion they appear to be led rather in conformity with what happens in human practice than from observations on horses. In oxen and sheep, according to all account, such occurrences happen ; but, then, they possess a gall-bladder and additional duct, the same as man. Changes of diet and derangements in the digestive function are also mentioned among the causes of jaundice : I cannot, however, as far as my own practice has gone, put much faith in them. Mr. Shipp has remarked, that green food, clover and vetches, dispose to jaundice.

The TREATMENT of jaundice must be conducted upon the plan I have already laid down for the cure of hepatitis. Inflammation being the proximate cause—the morbid agent—that it is which should be made the main object of attack. At the same time, we must have in view the ejection from the system of the redundant bile. Blood-letting will aid in this, but purgation will accomplish it most effectually. For more particular directions how to proceed in the treatment turn back to “hepatitis,” both acute and chronic.

RUPTURE OF THE LIVER—HEPATIRRHŒA.

HEPATIRRHŒA from *ἥπαρ* “the liver,” *ρεω* “to flow” has obtained a sort of reputation among Veterinarians for signifying *burst* or *rupture* of the liver ; whereas, in human medicine, it is used (when employed at all, which appears is very little) to signify some combination of excessive bilious secretion, or flow of bile, with diarrhœa or dysentery, so that the patient’s stools are what are called “bilious.” It can only be applied to *Hepatirhexis* or rupture of the liver, on account of the *flow* of blood which under such circumstances takes place.

Rupture of the liver appears to be a disease peculiar to animals ; it is one unknown in our own persons.

Horses advanced in life, who, from being well fed, and but little or but occasionally worked, grow fat and gross in

their bodies, become the especial subjects of this lesion. In a very interesting communication on the matter from Mr. Siddall, V.S., Royal Horse Guards, he writes, "it has only occurred to me once to see a horse with this so young as seven years old." Mr. Wright, V.S., Brighton, observes of this disorder—"The most striking point of coincidence in all the cases of this disease that have ever been brought under my notice, is, its invariably appearing in horses of the *same temperament and habits.*"¹

Mr. Greening, V.S., Brixton, relates a case, in the VETERINARIAN for 1851, of a "bus horse," who died from ruptured liver at six years of age.

PATHOLOGY.—The age and habits and condition of horses found disposed to this accident are such as to conduce to, and would indeed indicate, some morbid condition of the liver. There are two states, and very different ones, in which the ruptured gland has been found: a state of congestion gorged with blood; and a pale, clay-coloured, softened, disorganized, fragile condition of it. D'Arboval and other French writers make most mention of the former; most British veterinarians describe the latter. In either case, the gland is in a state exceeding prone to burst or rupture upon application of any exciting cause. And we can very well imagine how the gland has come into such a condition when we come to consider the age and habits of life of the subject of it, and compare him with other animals placed under similar circumstances. The stall-fed ox being so subject to disease of liver, is it not reasonable to suppose the horse stall-fed should be disposed to similar disorders? In very many of these cases, chronic disease in the liver appears to have prevailed for many years without at all disturbing the usual sound health of the horse. And this seems to proceed to a certain point from interstitial effusion and distension; when, in its hypertrophic and rotten condition, the gland bursts at some part, and blood becomes extravasated underneath the peritoneum, bursting at length its network, which is immediately followed by hæmorrhage into the abdominal cavity; sparing, perhaps, at

¹ 'Veterinarian,' vol. xix, p. 39.

first, but shortly becoming profuse and destructive to life. Cases now and then occur which give us room to think that partial bursts takes place, and the horse lives for days, or even, supposing he is not at work, for weeks afterwards. The coagulum retained in the rent by the peritoneum, becoming firm, and in some cases semi-organised, operates for the time as an essential stay to fresh hæmorrhage. The question, in these cases, almost all of them in *old* horses, appears to arise, whether the liver be not the subject, in the first instance, of local plethora or congestion, and subsequently, in the course of time, of disease, arising out of that condition; which, through absorption of the colouring, and serous parts of the blood, gradually turns out to be the foundation of that morbid change of the gland which consists in a clayey softened, disorganised state, and sometimes *granular* condition, we in practice designate by the phrase “rotten.” The liver, we are in the habit of saying, was found “as rotten as a pear.” In this way it is that—

ENLARGEMENT OF THE LIVER takes place, to such enormous bulk as is by several of our profession recorded. Mr. Field mentions a case in which liver had increased to 42 lb. Mr. Henderson (VET. 1846) found the gland to weigh 55 lb. In the case of J. Field’s (from which the symptoms were taken at page 327), the right lobe of the liver had burst: still, the gland weighed 42 lbs.

In a case of disease of the heart and liver, related by Mr. Henderson, jun., in the VETERINARIAN for April 1846, the liver was enormously enlarged, weighing 55 lbs. (Vide case of F 5. ‘Reg. Record of Sick,’ page 228, occurring in August 1852.)

Chronic hepatitis is a disease so obscure and insidious in its course, that horses in general have it without any knowledge on our part of its existence: in fact, we rarely know anything about it until the subject of it comes to die, perhaps from ruptured liver, and we find the gland clay-coloured, softened, and so rotten in texture that it will hardly bear handling without falling to pieces. Supposing, however, the liver to continue sound under these predisposing causes to

disease, it is still very likely to become congested—filled to bursting with blood, from general plethora, and consequent oppressed and languid circulation ; and in this condition does the gland become liable, from the same causes, to burst or become ruptured. D'Arboval mentions the case of a horse who was attacked with symptoms of founder, and was treated for them ; but who, on his being admitted into the College at Alfort, shewed quick pulse, and hurried and irregular breathing, without manifesting any pain, and four hours after fell suddenly down, and died without a struggle. The liver had acquired the enormous volume of sixty-two pounds, was intensely black, as if it had been steeped in blood, and presented along the inferior border a considerable rent, from which had escaped about three gallons of blood.

The RUPTURE in most cases, I should say, happens all at once ; but the hæmorrhage from it would appear as if it became partly—nay, in some cases, perhaps completely—stanch'd, and this is followed by one or more relapses. To these deductions we are led from a consideration of the symptoms in the various cases we have witnessed and from reported accounts. In a case that occurred to Mr. Siddall, the horse had been ill, and subject to frequent faintings for *upwards of three weeks* before he died ; which appeared afterwards to have been caused by partial ruptures of the peritoneal covering of the liver in different places, from all which he rallied, not sinking until the grand rupture itself had happened.

A grey coach-horse, belonging to his Royal Highness Prince Albert, had been unwell the day before—heaving at the flanks, and off his feed—when Mr. Siddall was sent for to attend. His respiration was now short, accompanied with sobbings, particularly when moved ; though comparatively tranquil while standing alone undisturbed, except now and then, when a sort of paroxysm came on. Extremities cold ; pulse frequent and small, and easily compressed. Sclerotic coat and buccal membrane blanched ; tongue covered with frothy saliva ; breath stercoracious ; fæces scanty and dry. Medicine and gruel were prescribed. The next morning the groom found he had eaten his mash, and thought he appeared

more cheerful. Soon afterwards, however, while doing something up-stairs, over the stable, the groom heard him fall, and in a very few minutes after, he breathed his last.

In this case, the horse survived forty-eight hours after his attack.

THE IMMEDIATE CAUSE OF THE RUPTURE appears to be either excessive distension, or some sudden effort of respiration or bodily exertion, or some injury. In a case which happened in my own Regiment, the troop-horse had been standing for thirty hours, unmoved, in his stall. He refused his food, for the first time, one Sunday at noon; at four o'clock, p.m., he was perceived to rock about in his stall, as though every moment he would fall; the farrier-major was immediately sent for, and bled him, and while his blood was flowing he fell and died. His belly contained twenty quarts of black viscid blood. His liver was rent across its concave or posterior part; and, with the exception of the breach, was everywhere clay-coloured and highly lacerable. In this case, distension of the bowels at the time that some effort was made in the breathing, appears to have occasioned the rupture of the fragile liver. The same may happen through bodily exertion. Mr. Brown, of Melton Mowbray, was sent for in a hurry to attend the 'Old Queen,' a famous huntress. Two days antecedent to her ailment she had gone through a good run; having four months previously experienced hepatitis. A few minutes after Mr. Brown's arrival she died. The liver was found clay-coloured and disorganized, and "its thin parts brittle." A kick, or blow of any kind, may occasion it. M. Millot, V.S., Vitteaux, was sent for to a horse who had symptoms of colic, but who—from being pressed and tapped on one flank while the other was supported, giving out sounds of the presence of fluid—M. Millot thought had peritonitis. In twelve hours he died. The belly contained two gallons of black blood, mostly coagulated. A rupture, with irregular and fringed borders, two inches long, ran across the left part of the anterior surface of the liver. The horse, it came out afterwards, had been the day before several times kicked upon the chest by other horses.

The SYMPTOMS will vary, and be more or less characteristic, according to the nature and extent of the lesion, the stage the case happens to be in, and other circumstances. The horse grows dejected and loses his appetite; his respiration becomes short by fits—sobbing or sighing perhaps—and much distressed should he be moved at all; sometimes there is a sort of catch or arrest observable in the respiration, the animal making two expirations to one inspiration; the membranes of the eyes, nose, and mouth become exsanguineous and pallid, or they may exhibit a yellow tinge; the extremities are cold; the pulse frequent, and small and weak, at times quite imperceptible; countenance distressful; tremors, and cold sweats; instable upon his legs, rocking from side to side in the stall, or staggering in his walk, till at length he on a sudden falls down and experiences a sort of fainting fit, followed by convulsions; from this he perhaps recovers and rises again, but distrustful of his declining strength, he stands with his legs stretched out underneath him, like so many physical props of support; sooner or later he sinks again in another fainting fit, the pupils of his eyes growing amaurotic: at last he falls to rise no more, and in convulsions he dies. (J. Field.)

Cases do, however, occur wherein restlessness is evinced, lying down, &c., as though colic were present, with occasional similar attacks; though it may be remarked that the animal all the time is very cold.

WHAT IS TO BE DONE in such a case? Certainly not what ignorant farriers and grooms are in the practice of doing—*bleed*. No! this must be regarded as a case of *passive* hæmorrhage; and as such must be treated by sedative and styptic measures, and not by depletives. The coldest water may be dashed against the right side, or ice may be applied upon it. A clyster of cold water may be administered. And in regard to internal remedies, the best, perhaps, will be found to be oil of turpentine, that being both styptic and stimulant. Sugar of lead, also, so famed in human medicine, may be tried. And I should

say it would be highly advisable, in many cases, to administer an opiate. The late Mr. Field was in the habit of exhibiting copaiba balls in such a condition. Refer to the treatment recommended for hæmoptysis, at page 154; and to the remedies recommended for epistaxis, by Mr. Rogers, at page 70 of the first part of this volume. The greatest quietude must be enjoined, and everything withdrawn or avoided likely to break in upon it. All that can be done, though it may put off for a while the fatal hour, furnishes little room for hope of any lasting benefit.

WORMS—HYDATIDS.

We read of worms being found in the biliary passages; I have never discovered any myself. Hurtrel d'Arboval enumerates their presence among the causes of jaundice.

HYDATIDS, I believe to be occasionally bred in the livers of horses. In those of sheep their presence is not so very uncommon; at one time the rot in those animals was ascribed to hydatids in the liver.

BILIARY CALCULI.

The simplicity of the biliary apparatus of the horse affords him a kind of immunity from biliary collections. I know but of one instance in which any were found. That is published by M. Rigot, in "The Transactions of the Veterinary School at Alfort, for 1833-4." Ninety of these calculi were taken from the hepatic tubes and duct of a horse by M. Rigot, and they were found to have occasioned considerable dilatation of those cavities, as well as thickening of their parietes. There existed no symptom during life to lead to any suspicion of the presence of the calculi. The same horse had a salivary calculus.

SPLENITIS.

As we progress in veterinary knowledge, we not only become better informed about recognised diseases, and more competent to treat them, but we obtain acquaintance with disorders of whose existence we had been either in doubt or altogether ignorant. Splenitis is of this latter class. No veterinarian any longer entertains a doubt about the spleen being the occasional seat of inflammation; but we have yet to learn by what symptoms we are to diagnosticate this. Mr. Blaine acknowledges never having met with a case of splenitis in his own practice; but informs us he had recently "heard of a well-authenticated one, in which the symptoms so exactly resembled hepatitis as to be mistaken by a very observant practitioner."—"The violence of the disease destroyed the horse on the fourth day." The spleen was found "highly inflamed, and nearly gangrenous." What I should take to be a similar case is narrated in 'THE VETERINARIAN,' for 1836, by Mr. Cartwright. The symptoms were those of colic. Indeed, so similar were they, that Mr. Cartwright acknowledges he "took it from the commencement to be obstruction of the bowels." The spleen—the only viscus diseased—proved "double its wonted size, gorged with blood, and black as jet. Its natural tough texture was quite broken down, and it was soft, and in a manner approaching to gangrene. There appears the singular coincidence between this and Mr. Blaine's case—that both patients died on the *fourth* day. I cannot say I ever encountered this active form of the disorder myself; but I have on several occasions found the spleen much enlarged, a change I should feel inclined to attribute to a sort of chronic splenitis.

We learn from Hurtrel d'Arboval that Ischenlin, veterinarian to the Grand Duke of Baden, has given the following description of the disease, under the denomination of *Gangrenous Inflammation of the Spleen*: "During the hot months—July, August, and September—rarely at other seasons, the disorder appears, and commonly as an epizootic.

The horse, the subject of it, becomes heavy, lazy, disinclined to work, indifferent, listless; walks unsteadily; with head hanging down; ears lopping; eyes sparkling, inflamed, irritable, tearful; nasal membrane pallid and dry; expired air cold; mouth likewise cold and dry; tongue furred; also discoloured, as well as the gums and palate. The respiration is at one time accelerated, at another slow; seldom a cough is heard, and that is dry and feeble; the pulse is quickened, oppressed, irregular; the belly is tucked up, tense, and hard; the dung dry and dark-coloured, or else soft and ill-digested; coat rough and pen-feathered. These precursory symptoms endure two or three days, or only as many hours, the animal eating and drinking well all the time; then comes on fever, a cold shivering fit succeeded by a hot fit, together with loss of appetite. In some one or other part of the body, soft swellings make their appearance, acquiring considerable volume in the course of a few hours, and emitting, when opened, a yellow serous fluid, mingled with black blood. They do not suppurate, but run on to mortification. And now the animal's strength fails him; he with difficulty sustains himself standing; his body swells; and a tranquil death, rarely attended by hæmorrhage, puts an end to his sufferings."

I must confess I feel myself but little informed by this relation of symptoms. It is, to my mind, an account which rather tends to show that splenitis is a subject on which the French veterinarians are as much abroad as ourselves. The morbid change to which *post-mortem* examinations would lead us to believe the spleen to be most disposed, is hypertrophy or enlargement.

HYPERTROPHY OF THE SPLEEN.

In several instances I have found the organ hypertrophied; in some, very considerably augmented in volume and weight, and yet exhibiting no appearance of disorganization. In one horse I opened, the gland weighed fourteen pounds two ounces; making eleven pounds in addition to its ordinary eight. It has been found even larger than this.

Mr. Mogford, V.S., details five cases in 'THE VETERINARIAN,' for 1832, in one of which its weight was found to be fifteen pounds, and in another supposed to be twenty pounds. Mr. Mogford also suggests a very natural and facile mode of detecting such enlargements during life:—Having first emptied the rectum by raking and injections of warm water, Mr. Mogford passes up his arm, previously oiled, and, “with a creeping-like motion of the hand,” pushes on to the colon, where the hand being perfectly at liberty, can be turned to the left side, and detect any enlargement there may be—with certainty, if to any great extent—of the spleen.

A still more enlarged spleen was found by Mr. Lewis, V.S. Monmouth, in a fatal case of peritonitis and ascites. “The spleen was enormously hypertrophied, its weight found to be *much above* twenty pounds.” ('THE VETERINARIAN,' vol. xxv, p. 607.)

Mr. Tait, of Portsea, makes mention of a case in 'THE VETERINARIAN' for 1837, in which the spleen was found to weigh “upwards of fifty pounds!”

When from any unthrifty or ill-conditioned state of skin; from signs of indigestion or disordered bowels; from general unhealthiness and loss of flesh; from perceptible tenderness or feeling of enlargement in the left side, or any other unusual manifestation, we have reason to suppose the spleen to be the seat of the disease, I know of no means so well calculated to clear up our doubts on the point as those recommended by Mr. Mogford—manual examination *per rectum*.

The TREATMENT must be altogether regulated by the view we may take of the case. Should there appear to be some inflammatory action going on, it will be right to bleed, but not to a large amount, and to repeat the evacuation. We may also purge moderately. At the same time a blister may be applied to the left hypochondriac region. Abstinence from labour will be required while we are doing this. And after this has been done, I know of no more likely remedy to work some beneficial change than mercury. I would give it, as Mr. Mogford does, in combination with antimony, in

small doses, such as half a scruple of calomel to a drachm of antimony, twice a day for two or three weeks, then clear all off by a common purge.

OSSIFICATION OF THE SPLEEN.

The late Mr. Henderson, V.S., Park-lane, London, had in his possession a fine specimen of the OSSIFICATION OF THE SPLEEN. An abscess, about the size of an apple, whose parietes were found to be osseous, had formed within the gland, next the stomach, midway between its base and apex, from which was liberated, after death, a coffee-coloured purulent fluid. The horse from whom it was taken was a subject much wasted in condition, casually brought to the slaughter-house.

RUPTURE OF THE SPLEEN.

From year to year, recorded cases of this lesion, occasionally fall in upon us :—

In the year 1812 I was called to a horse, then loose in straw-yard, about seven o'clock P.M., in consequence of his being "griped." I had him instantly removed into a stable, and administered two ounces of oil of turpentine. As he appeared relieved, nothing more was done that evening. The following morning, he experienced a relapse of the same symptoms in a more violent degree, of which he died about ten o'clock A.M. Shortly afterwards the body was opened. The first appearance which attracted notice was, that the guts were stained here and there with blood; and they were no sooner removed than from ten to twelve quarts of that fluid, partly congealed, were found effused into the belly. At first, I suspected this hemorrhage to have been caused by the bursting of some important blood-vessel; but further examination shewed the spleen to have been ruptured to the extent of about four inches, along its convex border, where it is opposed to the false ribs. While I was inspecting this wound in the spleen, which was now filled with a coagulum, I was amazed at the prodigious distension of the stomach with air—indeed, it occupied so much of the surrounding

space that I felt inclined to believe it might, by compression, have proved the *cause of the rent in the spleen* during some violent effort in respiration ; for I could find no mark whatever of kick or any injury upon the side, either inwardly or outwardly.

Mr. Cartwright has reported a case, since this occurred, in 'THE VETERINARIAN' for 1838 :—

May 26, 1838, Mr. Hutton, of the Fauls Green, sent out his brown gelding, four years old, half-bred, and in good condition, for cavalry duty. He was not, however, ridden hard in ranks, in consequence of his rider having a bad leg. Although, while there, nothing serious appeared amiss with him, still his rider thought he shuffled about more than usual. At two o'clock P.M. he returned home, and began eating and drinking. At three o'clock P.M. Mr. Cartwright was fetched to him. He had been uneasy, moving about and pawing. His pulse was 55 ; respiration natural. Mr. Cartwright thought there was some irritation in the bowels, and gave opium. Though his pulse came with force to the touch, yet there was something that indicated difficulty in the blood being driven along. The conjunctiva was pale. He lies down at full length, but does not roll over. Looks at his side. At eight o'clock P.M. he was bled. On pressing, the vein felt flabby, and was not distended as usual. Blood with difficulty obtained, and very thin. Nine o'clock, worse ; pulse at the jaw almost gone, and not distinct at the chest. He would stand tottering about for some time, and then fall violently down anywhere. Mr. Cartwright began to fancy there was rupture of a blood-vessel. Nine to eleven o'clock P.M., very hopeless ; falling down every twenty minutes, and once or twice has rolled over ; seems insensible ; pulse imperceptible ; ears deadly cold ; cold sweats ; stertorous breathing ; and when down gasping and struggling dreadfully. Died at eleven o'clock P.M. From eight to ten gallons of blood were found in the abdomen. A coagulum near the stomach led us to the upper surface of the spleen, in which was a rupture, towards the largest end, five inches in length. Two tumours were discovered upon other parts of the spleen, which looked like, and, indeed, on being cut open

were found to consist of, masses of dark coagulated blood, and seemed as if a little more distension would have ruptured them also. There was a good deal of spotted dark bloody deposit in the neighbourhood of the spleen, on a portion of the diaphragm, between its coats, on its thoracic side. The lungs were inflated and blanched. The heart without blood and quite flaccid; and no blood in the vessels. The stomach was full, but not at all distended. Mr. Cartwright adds, "I am sure the rupture was recent, and that the spleen did not exhibit any chronic or other disease."

Another case of ruptured spleen is to be found in 'THE VETERINARIAN' for 1853, in which it seemed to be connected with colt-bearing.

CARCINOMA-MELANOSIS.

On the 18th November, 1833, Mr. Well's chesnut horse—slender, white-legged, flat-sided, delicate, and six years old, had been much subject to cough that laid him up—was again brought to me for being "off his food, and having a cough." I ordered him some aperient febrifuge medicine, and had his throat sweated. In ten days he was returned, convalescent, into his own stable. There, he was not treated as in his convalescent state he ought to have been, but was put to be broke into harness, and altogether a good deal abused; to which I attributed his re-admission into my "sick list" on the 7th December following. On this occasion he was bled and blistered, and otherwise treated as a chronic pulmonic. He was bled a second time; but soon after such debility manifested itself, that it was evident depletion could be carried no further. His appetite now, however, became better, and he lay down and took his rest well. Still he looked unhealthy in his coat, and day by day lost flesh. His respiration has never been visibly disturbed, and his pulse is now but 50. Indeed, his only unfavorable symptom is, emaciation. And to such a height did this atrophy run, that towards the end of the month it was perceptible all hope of recovery was extinguished; and the consequence of this report was, an

order from his master to have him shot, which was done on the 30th December. In his belly was found an enormous tumour, occupying on the left side all the interspace between the stomach and the pelvis, and appearing to absorb the entire substance of the spleen. It was globular in its general outline, measured four feet in circumference, and weighed sixty-seven pounds. Being divided with a sharp knife, the surfaces of the sections presented a marbly aspect, arising evidently from the varied composition of the interior. The superficial parts consisted of a soft, morbid sort of fatty substance, which, as we approached the centre, became mingled with fibro-cartilaginous intersections, of which latter substance the more central portions or body of the tumour appeared to be almost entirely composed, the radii which were sent out among the fatty and superficial parts having in the centre become consolidated into a kind of cartilaginous substance hard to be cut through. And yet it was reddish in its aspect, as though it had been vascular, and here and there presented cysts containing a yellow fluid and gelatinous matter, looking like serum and coagulable lymph, but which Mr. John Field—who was present at the examination—assured me were, according to Mr. Kyan's notions, specimens of *melanosis*. Further investigation clearly demonstrated that this immense tumour was to be regarded as deriving its origin from morbid growth and conversion of the spleen; for within the portion—about half of that viscus—still remaining, little globules or formations of fatty matter were to be found exactly similar in their character to the fatty portions of the tumour itself; and as a farther proof of this original structure, the spleen and tumour were so completely one body, that no line of demarcation, either outwardly in form or colour, or inwardly in composition, was to be made out between them.

On the 18th January, 1834, Mr. Anderson, V.S., Leicester, was requested to visit 'Contraband,' a dark brown stallion, rising eight years old, at four years old the best racer in the county, and afterwards hunted for two seasons, carrying fourteen stone, and sometimes three days successively. The

patient was feverish, with the testicles drawn up, and one enlarged; he was dull; but there was no appearance of acute inflammation. The groom, a very intelligent man, was doubtful whether a cancerous tumour did not exist, as he had seen the same symptoms in another horse, who died, and was opened by Mr. Baker, and found to contain a tumour weighing eighty-four pounds; but there was no bloody urine. Mr. Anderson thought at first he had a case of scrotal hernia. On the 25th he was convalescent, and had got into tolerably good condition. On the 4th February he was attacked with hæmaturia. On the hand being passed over the loins, he crouched to the ground, and there was a stiffness about the loins, and he constantly appeared to be in the attitude of staling. Mr. Anderson now thought the case was nephritis. He was bled and clystered, and had fomentations to the loins, and mustard poultices and astringent medicine.—12th, Still very feverish, and great quantities of coagulated blood have been discharged.—13th, Hemorrhage continues; but the inflammation is subdued.—18th, Immense quantities of blood coming away. Ordered sugar of lead, catechu, and zinc internally.—22d, Has passed a great deal of blood since last visit, and at present it is dropping from him. Testes drawn up. Mr. Anderson had a consultation with Mr. Rowland, V.S., Oton, Notts. They differed in opinion as to the nature and treatment of the disease, though both agreed that it originated in the kidneys; “but neither of us anticipated the existence of such a voluminous tumour.”—On the 23d the horse died. A tumour was found attached to the spleen, left kidney, and super-renal gland. The right kidney and the viscera were all healthy. The tumour weighed one hundred and two pounds; measured sixty-eight inches in circumference—including the spleen, seventy-three. Mr. Anderson sent off the tumour the same day to Mr. Youatt for examination, remarking only, further, that “two things are certain—previous inflammation, and death by excessive hemorrhage.”

Mr. Youatt examined the substance, and found it to consist of “a conglomeration of *carcinomatous tumours*, rising

one above the other, on the gastric surface of the spleen." It evidently had originated in the spleen—small portions of what remained of that viscus were found changing their colour: there were all shades of change; and the altered parts were of various size and structure. In some places there was an appearance of brain. It was a carcinomatous affection of the spleen, containing tumours of that kind termed *cephalomatous*. For a further and most accurately detailed account of this tumour, we must refer our readers to 'THE VETERINARIAN' for 1834.

Mr. Smith Huntley reports the following interesting autopsy in 'THE VETERINARIAN' for 1837:

In February last, Mr. Huntley was called to a mare belonging to Mr. Christie, surgeon; whom, on his arrival, he found dead. The bowels were highly inflamed. The spleen enlarged, weighing upwards of fifty pounds, and in a complete state of scirrhus. The pancreas was in a similar condition, and weighed more than thirty pounds. Also a small portion of the right lobe of the liver was so affected. The mare's prominent symptom was, falling away in flesh, although still feeding well, and up to within a short time of her death doing her ordinary work, "although not with any comfort."

The following case of MELANOTIC DISEASE of the SPLEEN, LIVER, INTESTINES, PERITONEUM, and ABDOMINAL PARIETES, occurred to the late Mr. John Field, from whose 'Posthumous Veterinary Records' I extract it:

"A grey gelding, belonging to Mr. A——, was brought to London on the 12th of February, 18—: he had been for some time previous much debilitated, and unable to work. The coachman supposed he was 'rotten.' The horse was very old.

"February 13th.—I was this day called in to attend him, when the following symptoms were observable: viz., loss of appetite; partial sweats; sighing; pulse 42 and very feeble; respiration accelerated; restlessness; membranes, conjunctive and buccal, blanched; curling and pouting of the upper lip, which the coachman had also noticed: from this

it was inferred that the horse had internal hæmorrhage, hepatirrhœa.

“At night there was profuse sweating; wandering about with tottering gait; sighing; pulse not to be distinguished; membranes quite blanched; respiration much accelerated.

“14th.—Lips cold; no pulse; respiration quiet; extreme prostration; vision unaffected. The horse died at ten o'clock A.M.

“*Post-mortem examination.*—On laying back the skin, many deposits of black, circumscribed lumps were observed in the cellular membrane of the groin, and likewise in the cellular and adipose membranes, between the different layers of the abdominal muscles, and also upon the peritoneum. On removing the peritoneum, and the layer of fat upon it, the intestines appeared blanched, but studded with melanotic tumours beneath the peritoneal coat, in the course of the muscular bands; also attached upon the peritoneal coat were small fringes of melanosis, staining, as usual, the finger or part rubbed against it.

“The spleen now presented itself of an enormous size, extending half-way down the abdomen towards the pelvis, but not far enough to be felt by the hand introduced within the rectum: when removed it weighed sixty-seven pounds, and when cut into exhibited the usual softened melanotic mass. This distension of the capsule of the spleen had caused a rent on the concave edge of the organ, from which the quantity of blood observed in the cavity of the belly had distilled, occasioning death from hæmorrhage. The liver was of the natural size, and its external coat was entire; but the surface was irregularly elevated, and on the section of different parts these elevations proved to be circumscribed melanotic tumours. In the omentum, and about the kidneys, were similar effusions, but none in the texture of the gland itself; similar tumours were also found on the brim of the pelvis, a common situation for melanotic tumours in *grey* horses. The heart and lungs were not examined.”

SECTION XIV.

DISEASES OF THE URINARY ORGANS.

NEPHRITIS { ACUTE.
CHRONIC.

ABSCCESS.

HYPERTROPHY.

CONDENSATION AND SCHIRRUS.

MELANOSIS.

POLYURIA.

DIPSOSIS.

ALBUMINOUS URINE.

HÆMATURIA.

DIABETES.

URINARY CALCULUS.

CYSTITIS.

CYSTORRHŒA.

ISCHURY.

DYSURY.

STRANGURY.

TAPPING THE BLADDER.

INVERSION OF THE BLADDER.

THE chief parts of the urinary apparatus are the kidneys¹ and the bladder: the ureters and urethra being but tubes serving as conduits to the urine; which by the former organs is elaborated, by the latter received and retained until such time as shall become convenient for its ejection. The exemption of horses from venereal affections, and their less liability than men to generate calculous disorder, contracts the list of their diseases of these organs: indeed, were it not for injury—inwardly as well as outwardly inflicted—we should probably hear but little of such diseases. Over-exertion and strain, particularly under heavy burthens, is one grand cause of renal disease; medicine, and food possessing active diuretic properties, constitute another; bearing all which in mind, it will at all times become a leading desideratum in the treatment, to take care to remove or avoid the repetition of such influences. The kidney of the horse is a peculiarly susceptible organ: it is easily acted on; and many—indeed most—medicines we are in the habit of

¹ In the 'Veterinarian' for 1835, mention is made of a horse having but a *single* kidney. It was a glandered mare brought to the Veterinary School for slaughter. The kidney was found at the entrance of the pelvis, situated rather to the *left* side. Its form was that of the right kidney, and it was as large as *two* ordinary-sized kidneys. ('Journal Théoretique,' 1835.)

using, take some effect or other upon it. I believe this to be one reason why so very few medicines operate as cathartics to horses: the majority of them so readily admitting of being carried out of the system through the secretion of the kidneys. A well-known fact, strongly corroborative of this opinion—one to which my attention was drawn in early life by my late respected father—is that of a copious flow of urine of a dark colour being frequently observable to take place in horses who have been but slightly or not at all affected by doses of physic they have taken, but who, notwithstanding the little or no purgative effect they have experienced, have afterwards evinced quite as much temporary weakness and loss in condition as though the physic had worked their bowels. I likewise set this down as one reason why mercury produces ptyalism with such comparative tardiness and uncertainty in horses. This susceptibility of the kidney, in veterinary medicine and dietetics, never ought to be lost sight of: it is of vast importance to us in practice—that which renders our practice in many cases so different from what surgeons would pursue under similar circumstances: we being able to effect so much more in the system of the horse, through the agency of these organs, than is to be accomplished in that of the human being. The veterinary surgeon, in fact, will often be able to effect that through the medium of the kidneys which the surgeon can only accomplish through the agency of the skin and bowels.

NEPHRITIS.

NEPHRITIS, from νεφρός and *itis*, inflammation of the kidneys, is, in an acute form, a dangerous disease, but fortunately one of infrequent occurrence in horses. When present, it is commonly assignable to some injury or abuse inflicted on the kidney. Girard informs us that it is an affection more frequent in ruminants than in horses, though attended with most danger in the latter. As an army practitioner, the cases that have fallen under my own immediate notice have been but few: this may arise from cavalry horses being, for

the most part, exempt from the causes to which, I repeat, I believe the majority of cases of nephritis will be found to be referable.

THESE CAUSES may be considered under two heads:—under those of *external injury*, and of *the use or abuse of food or medicine possessing acute active diuretic properties*. The exertions the loins are put to, and the strains they are liable to, in the violent and forcible extensions they are made to undergo in acts of hard galloping, in racing and hunting, and, in particular, in ditch-leaping, together with heavy draught up hill, cannot fail to endanger lesion of the delicate tissue, the kidneys, or of their envelopes; and our only surprise is, that such structures are not much more frequently injured than they prove to be, after efforts of the kind. The heavier the weight imposed upon the back under such circumstances, the greater must be their liability to receive hurt. Going long journeys without drawing bit, or drawing very heavy loads, must subject the animal to nephritic irritation. The practice—formerly so much in vogue in our cavalry—of halting horses on a sudden, and throwing them, unprepared, upon their haunches, is one that tends to put the loins to great trial. I believe, however, that inflammation of the kidneys is more likely to arise from substances of an acrid or irritating diuretic nature than from any of the before-mentioned causes. It used to be a common practice with grooms—and is, indeed, too much so at present—to be continually giving their horses “urine balls,” without any regard either to the strength or the composition of them, or, indeed, any other property appertaining to them, save that they bear the appellation of “urine balls:” a practice not only absurd in itself, but one highly calculated to inflame or otherwise disorder the kidneys. The same disorder may result from the use of foxy or musty oats, malted barley, mow-burnt hay, &c., though these are more likely to induce functional than structural disease. When the disease arises from food or water of any deleterious or improper quality, it is likely to assume an epidemic form. Cold wet seasons, in horses predisposed to nephritic com-

plaints, may bring it on. The presence of calculous matters in the kidneys would doubtlessly be apt to excite inflammation in them : but that is, at least in horses, but a remote contingency. Suppressed perspiration is generally ranked among the causes of nephritis ; some add, suppressed eruptions, evacuations, issues, &c. It would seem also as though inflammation might be propagated from the bladder, along the ureters, to them. After all, however, nephritis, in the acute or painful form, is, as I before observed, but a somewhat rare disease.

The SYMPTOMS of acute nephritis are such as indicate great pain and suffering. The animal is continually up and down, looking every minute back at his flank, staling, or trying to do so, continually ; and this leads at once to the suspicion of irritation or disease of the urinary organs. The case may, perhaps, after a time, exhibit characteristic symptoms, such as an awkward, stiff, straddling gait, with the hind quarters ; standing with the hind legs stretched apart, and with the back roached or “ stuck up ;” unwillingness to turn about or round in the stall ; flinching from pressure upon the loins ; though all, or even any of these symptoms, are not uniformly present : the leading symptom being the disorder of the urinary function. Sometimes the urinary discharge is altogether suppressed, though oftener reduced to small and frequent evacuations which are pale, though at times high-coloured, and pungent, perhaps bloody, or it may be like whey in appearance, from the presence of albumen or purulent matter ; continually making efforts to stale, groaning and straining the while, squeezing out what amounts but to a few drops : if the bladder be examined at this time, it will be found nearly or quite empty. These symptoms are accompanied by others, denoting the degree of irritation and fever present, brought on by the extreme pain the animal endures : the pulse becomes quick and hard, and contracted ; the horse paws with his fore, or stamps with his hind feet, and will occasionally lie down. Now, he may heave at the flank ; and at the same time perspire—the perspiration having,

according to Girard, on occasions, an urinous odour: the mouth is dry and hot; great thirst; constipated bowels.

CHRONIC NEPHRITIS.—I am inclined to think that nephritis in a mild or sub-acute form exists in many instances wherein, from the trifling perceptible alterations induced by it in the ordinary health of the animal, we are apt either altogether to overlook the disease, or else to regard it as too unimportant to notice. Horses are often brought to us with complaints of difficulty or pain in staling; of the urine they pass being thick, or foul, or bloody; and which horses probably may, on inquiry, be found to show some stiffness about the loins when first brought out of their stable, though by use the parts quickly grow pliant again. And yet in general way they exhibit every sign of health. With these facts we may connect the circumstance of occasionally discovering in horses, who have died from other causes, purulent matter within the kidneys, and now and then disorganization of their substance, and without anything having occurred during life to direct our attention to those organs.

The DIAGNOSTIC SIGNS of acute nephritic disease are the painful annoyances the animal is continually suffering from the irritation created by continual desire to void urine, even at times when he has none to discharge; though in other cases frequent dribbling discharges are taking place, which serve to keep the animal quiet while the urine is running. Symptoms which have more repute than reality perhaps, such as, peculiarity of gait behind; tenderness upon the loins; indisposition to lie down, and pain and difficulty in rising, are less deserving of notice. The quality of the urinary discharges varies: sometimes they are thick and sedimentous; at others, thick and pungent; at times, bloody; always scanty. These will serve to distinguish the complaint from gripes and other painful disorders of the bowels: but these are not sufficient of themselves to enable us to discriminate between this and affections of the bladder. In cystitis, the same incontinence of urine will show itself; but in this case the discharges, though small, will collectively amount to as much as they do in health, and moreover will consist of urine pos-

sessing its *natural* character. Inflammation of the *neck* of the bladder will produce suppression of the urinary discharge, or suffer but a little to pass, and may so far at first mislead us: we have but to examine the bladder, however, to set us right in our diagnosis; should that prove distended with healthy urine, we shall have evidence enough that the fault does not lie in the kidneys. With our hand in the rectum, we may reach as far as we can towards the kidneys, with a view of ascertaining if there be any unusual heat to be felt, or tenderness created, expressed by the animal.

The TERMINATIONS of nephritis are *resolution, suppuration, condensation* and *scirrhus, softening, mortification*. I believe the termination most likely to ensue to be suppuration of the mucous surfaces of the organ—of its infundibula and pelvis, a case in which the matter passes off along with the urine: though the substance of the gland, as well as the pelvis, has been known to become itself the seat of abscess.

Mr. Tombs has related a case of acute nephritis, in 'THE VETERINARIAN' for 1844, in which, with symptoms of suffering and irritation, the horse was "frequently staling urine, thick and pale-coloured." He died on the third day, and all the parts were found in health excepting half of the right kidney, which was in a state of suppuration.

ABSCESS—SOFTENING—MORTIFICATION.

An interesting example of this is given by D'Arboval:

"A mare fell into a hole, out of which she was got with great difficulty. From that moment she experienced inconvenience in locomotion: the vertebral column appeared inflexible; the pulse tense and irregular; the urine scanty, thick, and sometimes mingled with streaks of blood. The mare lay down but little, not being able to raise herself up again without great pain. M. Chouard being called to her, perceived at the superior part of the right flank a considerable swelling which had been there some time, and had continued to augment from day to day without any sign of inflammation. At the end of a month he opened the tumour, and let

out a prodigious quantity of pus. The puncture cicatrised; but in six months' time a deep fistula had formed in it, which, every time the horse moved, ejected a stream the size of the finger of white grumous pus. Notwithstanding it was twice laid open, the fistula would not heal, and the horse sank. Pus was found effused in the abdomen. The right kidney was four times its natural magnitude. Its pelvis, greatly distended, contained about three pints of grumous pus, communicating outwards through an opening in the posterior border of the kidney, which led into the fistula that had formed between the peritoneum and psoas muscles. The left kidney was larger than common, and its pelvis was distended with nearly a quart of limpid urine. The bladder, shrunk and thickened in its coats, contained but very little urine, and that sedimentous.

Of SOFTENING, a very satisfactory case is related in 'THE VETERINARIAN' for 1828, by Mr. Cartwright:

"Each kidney was found to be in a complete state of putrefaction, of a light bluish colour: its texture so totally destroyed that the finger would pass through any part of it as through so much mud. The vessels of the kidneys did not appear diseased as I drew them out of the diseased masses."

Hurtrel d'Arboval regards mortification as a more frequent termination than suppuration; and gives the following as—

The SYMPTOMS INDICATIVE of MORTIFIED KIDNEYS: Urinary discharges, brown or black, filamentous, and fetid; pulse small, irregular, intermittent; recurrence of sweats, and, these all at once ceasing, the patient falls, and in violent convulsions expires.

HYPERTROPHY.

An instance of this, to an enormous extent, and proving fatal, is related by D'Arboval.

Of ENORMOUS ENLARGEMENT, a case is related by Mr. Freemann, V.S., Winchester, in 'THE VETERINARIAN' for

1839. The horse was a coach-horse, entire, seventeen hands high, who became, from being *light* in his carcass, "as large as a cow." And when he lay upon his *left* side, there could be seen and felt a tumour of large size, arising from something pressing against the parietes. There was also much anasarca of the belly and scrotum. The horse covered up to this time. Before his death occurred he staled blood in large quantities, though that might have arisen from instruments improperly used. The right kidney was enlarged to that degree that putting my arms round it, I could only clasp my hands, but could not lift it." The natural texture was lost; it seemed to consist of cheesy matter enveloped in a strong tunic. The other kidney was healthy, though rather larger than natural. The enlarged kidney was supposed to weigh upwards of 112 lb.!

M. Clipy was called to attend a horse for being off his feed, which up to that time had always enjoyed good health. He found his gait difficult, especially of the hind quarters, and that the slightest pressure upon his loins produced great pain, particularly when he was made to bend downwards, which he with all his power resisted. Urinary secretion scanty and bloody. The next day, in raking the horse, the rectum was found hotter than natural, the bladder in a state of semi-plenitude, and thrust, as it were, into the pelvis; the kidneys of an enormous size; and at the least touch of them the patient expressed great pain, and struggled to rid himself of the man's arm by violent contractions of the abdominal muscles. In spite of the most active antiphlogistic treatment, death ensued in eight days. The kidneys were found enormously enlarged, weighing each from twenty-four to twenty-seven pounds, occupying all the posterior part of the abdomen, and in some measure blocking up the opening into the pelvis, their inferior surface being upon a level with the pubes. Their surrounding cellular tissue was very much infiltrated, and their internal substance generally reddened.

OF CONDENSATION, INDURATION, AND SCIRRHUS.

I have seen several specimens in wet preparations. The following cases from D'Arboval, in illustration of these changes, are worthy our attention :

“A horse suspected to have strained his loins, was for three months under the treatment of an empiric. For the first two he continued standing; at length he lay down, never to rise again, and died in a complete state of marasmus. In opening the body, M. Chouard discovered that the left kidney, of its ordinary volume, had become cartilaginous. Its pelvis contained a large glassful of limpid urine. The right had also begun to undergo the same change, and had become firmly adherent to the peritoneum. In the bladder were found several stones about the size of peas: and one within the left ureter. Here, therefore, existed urinary calculi. But in the case which follows, nothing of the kind was discovered :

A horse, eight years old, strained his loins in descending a steep declivity; but in spite of the inconvenience it occasioned him in going, continued his work for eight months afterwards, at which time M. Chouard first saw him. He had not lain down more than twice or thrice since the accident, and was now couched upon his hind parts like a dog. The urine, which until now had passed frequently and in small quantities, had become suppressed altogether. There was obstinate constipation, and the patient appeared to suffer violent pains in passing his dung. He was destroyed. The left kidney, in a state of induration, had become a carcinomatous mass, of the size of a man's head, and about eight livres in weight, in the centre of which was a nucleus of suppuration. An aneurism, as large as the aorta, existed in the renal artery of the same side.

MELANOSIS.

The following is extracted from Professor Andral's celebrated ‘Treatise on Pathological Anatomy:’

Messrs. Trousseau and Leblanc found, in a horse's kidney, a fibrous cyst of the bulk of a fist, which contained eight ounces of black fluid, formed of the different elements of the blood, and particularly of the colouring matter. In fact, there is scarcely a tissue in the body in which melanosis has not been found in some form.

TREATMENT.—Our business here is, to abate inflammatory action as well in the system as in the kidneys themselves; and, at the same time, to do all in our power to assuage the irritation in the glands, and so allay the pain consequent on it. Nothing will operate more quickly and effectually in the fulfilment of these objects than blood-letting. Draw without delay through a large orifice as much blood from the jugular as the pulse will bear: from four to six quarts may commonly be abstracted with advantage. This should be succeeded by the administration of an ounce of aloes, alone or in combination only with treacle. Should the animal not have been raked at the time the hand was introduced to ascertain the condition of the bladder, it will be proper to perform that operation now, and to follow it up by the injection of a clyster of two or three gallons of tepid water, rendered lubricative by the addition of starch. The patient ought to be wrapped up in the warmest clothing, and have his legs bandaged with flannel, it being of great importance to maintain a hot skin—nay, if we have it in our power, to produce a moist one. All this done, and our patient provided with a loose ventilated box, an ample bed, and a pailful of water (rather gruel if he will drink it) he may for a time be left to himself. A few hours hence he may require a second venesection; not, perhaps, to so large an amount as the first, but still large enough to make evident impression. Girard talks of bleeding *nine* times, Hurtrel d'Arboval of repeating the same *ten* or *twelve* times, in the course of the first twenty-four hours. Evacuations of blood at such short intervals cannot but be small, and, in my opinion, insignificant and unimpressive: myself, I prefer, especially *at first*, the practice of giving an effectual blow to the disease at once:

I have invariably found this better than tampering whenever *acute* inflammation was raging. Whether he require or not so early as this a second venesection, the clyster ought to be repeated at the interval of a few hours, and continued at like intervals until such time as we see signs of the purge coming into operation: an additional reason for these frequent injections of water, as hot as can be borne, being that they may act as a sort of internal fomentation. Stimulants to the loins are commonly recommended, and I believe with reason; but there needs no immediate hurry about their application: they will take little or no effect—at least no beneficial effect—until such time as we have succeeded in lowering the inflammatory excitement. There is a notion abroad that blisters are apt to do harm here in consequence of cantharides being supposed to be a stimulant to the kindeys themselves; and such I believe they are, and therefore, perhaps, are prudently laid aside in nephritic disorders: at the same time I have known cantharides to be given to horses in considerable doses—in doses to excite inflammation of the bladder—and yet to make no morbid impression upon the kidneys. Some practitioners pour boiling water upon the loins; others prefer an embrocation made of mustard and boiling vinegar. For my own part, I have no great objection to the use of a blister, provided it be sponged off with water as soon as it takes effect: I say this because with many persons it is a consideration that the skin should not be blemished by being denuded. The animal should be allowed water *ad libitum*: indeed he ought to have a large bucketful constantly within his reach—either of gruel or water; the latter, probably, is best, simply because he will take more of it, it being the *quantity* of the diluent, and consequent dilution of the urinary secretion, we are rather concerned about than its quality. Mucilaginous infusions or decoctions of all sorts certainly must prove of service in mingling with the urinary fluid, and rendering it less obnoxious to the irritable passages; but one cannot get horses to drink these fluids voluntarily—one is obliged to dose them, and this forms my objection to their exhibition. The object may be

met in another way, by giving gum-arabic or starch, or mallow extract, or, what is probably better than all, gum tragacanth, made up into balls.

Should these measures prove of avail in staying the destructive course of the inflammation, the subsequent treatment of the case need consist but in keeping the bowels soluble, the skin supple, and the stomach in a condition to digest its food and create appetite: objects which the following ball, given daily, is probably well calculated to fulfill—

Take of Purging mass	3j
Tartarised Antimony	3j
Carbonate of Soda	3ij
Mucilage sufficient for a ball.	

Should purging result from its daily administration, it must be discontinued, or the purging mass be reduced to half a drachm in quantity. On the other hand, should the inflammation in the gland, in opposition to all our remedial efforts, pursue its course and end in mortification, death will speedily close the scene upon us.

POLYURIA.

This term is used in human medicine by Dr. Elliotson to denote a profuse or inordinate quantity of urine: that eminent physician, very properly in my opinion, questioning the correctness of a nosology which regards simple excess of urine as diabetes, seeing that in the disorder properly so called the secretion becomes altogether altered in quality, containing sugar, and is not *necessarily* in greater abundance than usual, although that is a very common attendant. This is an error into which our writers on farriery, and of the veterinary class, have fallen, under the impression that mere augmentation of the urinary secretion, with or without fever, constituted *diabetes*. When considered under the head of diabetes, this disorder obtains the epithet of *insipidus*, in order to distinguish it from the true or sugary form of the disease, which is called *diabetes mellitus*. In horse

medicine we appear to have still greater reason to consider these disorders as separate; since polyuria is by no means infrequent among horses at a certain period of life, and under certain circumstances; whereas diabetes mellitus is a complaint hardly known: and besides, there are other forms of altered urinary secretion which might with quite as much pathological and etymological propriety be ranked under the head of diabetes. I therefore repeat, it would be better if medical and veterinary practitioners would come to the understanding, that nothing but the presence of sugar in the urine constituted *diabetes*.

SIMPLE AUGMENTATION of the urinary discharges, without any material change in the composition of the urine, is the effect of a multitude of causes, some of an alimentary, others of a medicinal, and others again of a nervous nature, and when but temporary, can hardly be viewed in the light of disease. Every horseman knows how very often certain kinds of hay and corn occasion horses to stale more than they ought to do, and that drinking a large quantity even of plain water will produce the same result. Medicines called "urine balls," *i.e. diuretics*, are given for the especial purpose of increasing the secretion of urine. But nervousness will likewise do it—fright or joy, or anxiety of any kind almost, will make a horse stale inordinately. How frequently do we see hunters at the covert side, when the hounds are about finding, in their agitation, staling or continually stretching themselves out to do so; and we have all seen horses having wounds commence staling the moment the twitch is put on, from the recollection that such has been the prelude, on past similar occasions, to some painful cutting or dressing they had to undergo.

IMMODERATE THIRST—*dipsosis avens*.

Some few remarkable instances among horses are on record. Perhaps the most remarkable of all is the case that occurred, many years ago, to my late father, which I will here relate in his own words.

About the beginning of October, 1830, I was requested to visit a black gelding, the property of Mr. Banks, of Deptford. This gentleman, who had possessed the horse but a few weeks, informed me that the animal had *knocked up* in two or three journeys, and that of late he had refused his food, though he appeared to have a vehement desire for water, which, I understood, had been allowed but in sparing quantities. The animal shewed some general signs of ill health: his coat was long, rough, and staring; his belly tucked up; and he perspired freely from moderate exercise. His principal malady, however, seemed to be of a pneumonic nature; to relieve which, the common remedies, such as bleeding, blisters, &c., were resorted to: at the same time, I recommended his having water-gruel to drink instead of plain water. On my next visit, the servant complained to me of the horse's extreme thirst, which he said was such "that his whole time was taken up in making water-gruel;" and his master (probably at his instigation) wished me to take the animal under my immediate care (to Shooter's Hill), which I accordingly did on the 3d of November, by placing him at livery at the inn opposite my house. In the course of a day or two, the ostler discovered his appetite for drink, and represented to me that he consumed "all the gruel he could make for him." At this time, I must acknowledge my hopes of recovering my patient (from a malady of the nature of which I was confessedly ignorant) were declining; when, on visiting him as usual on the 5th, and finding that his inordinate desire for liquids had not, by very large potations of gruel been appeased, I resolved to ascertain, whether it was the gruel after which he craved, or whether he had really a preternatural thirst. Now, it was about eight o'clock, A.M., and he had already taken his usual allowance of gruel, when I ordered the man to fetch him a pail of water; this he ravenously drank, another as greedily, a third was swallowed with equal avidity, a fourth quickly disappeared, and a fifth followed. About a quarter before one o'clock I repeated my visit; and having found my patient by no means uneasy from the twenty gallons of water (the pail having been measured) he had already ingurgitated, I was willing to see if he had any inclination to renew his potations. Accordingly, another pail of water was offered to him; having drank which, apparently with undiminished avidity, he looked round in my face with eagerness for a second; this was followed by a third, a fourth, and a fifth: in fact, between eight A.M. and one P.M. he swallowed the prodigious quantity of thirty-eight gallons and one quart! Having, at length, quenched a thirst which I, at one time, almost began to despair of doing, no more water was given to him during that day, and medicine was altogether discontinued. This enormous ingurgitation, as was anticipated, was speedily followed by profuse discharges of urine; and in this way the bulk of the fluid appeared to have been disposed of; for no diarrhoea ensued, nor was there any consequent sensible perspiration.

From this time I may date the recovery of my patient. His appetite, before defective and declining, improved daily; his desire for water, though still remarkable, was not to be compared to what it had been; for, from the 5th to the 13th of November he drank, on an average, not more than eighteen gallons *per diem*; his coat, before rough and staring, grew fine and sleek; in fine, he became rapidly convalescent, recovered his condition and spirits, and was, in a few weeks, sent home and put to work again.

After an elapse of three weeks or a month, I met with him again, in harness; in the course of which interval, he had so much improved in condition and appearance altogether, that I could hardly recognize him as the same ill-conditioned, debilitated, hopeless animal I had been treating so little time ago. Mr. Banks told me that he was still "addicted to tippingling," but not to any considerable amount.—*Vide Lectures*, vol. ii. p. 530.

One very similar to it is related in 'THE VETERINARIAN' for 1837, by Mr. Charles, V.S., London, from which we extract it here.

In the beginning of June last, I was sent for to look at a horse that for three or four days, had been suffering from unquenchable thirst, drinking seven or eight pails of water daily, without being satisfied, and voiding an equal quantity of urine. He was a fine bay carriage horse, and, some weeks before, had two doses of physic, the last of which had little or no effect. I found his pulse rather lower than usual, his mouth cool, appetite diminished, and rather tucked up in the flanks. His hind legs, which previously were a little dropsical, were as fine as possible, much more so than I had ever seen them; his coat looked healthy, he was in high spirits, but, although he had worked as usual since he drank so much, he had never perspired: he was also rather costive.

His attendant was doubtful whether he had done right in giving him so much water: I, however, recommended that he should have as much as he would drink. I gave him a fever ball, and ordered him green meat instead of hay.

The next morning I was up early, that I might see what quantity he would drink. Having called the coachman, we proceeded to the stable, when the horse immediately began pawing, and looking round with the greatest anxiety for his water. We gave him four pailfuls—about ten gallons—which he drank in an incredibly short time, and he seemed to relish the fourth as much as the first. I called again in a couple of hours when he had two more pailfuls. We gave him no more at that time, as he was going out in the carriage. On his return, and in the course of the day, he had four or five pailfuls more, in all about twenty-five or twenty-

six gallons, and then his thirst seemed slaked only for a short time. He was continually staling, but evinced not the least tenderness when pressed over the region of the kidneys.

This continued seven or eight days. He ate the green meat, but seemed to be losing all relish for corn ; he got thinner, but still worked with his usual spirit. His work, however, was only short runs, rarely extending beyond ten or fifteen minutes : had it been otherwise, he must have failed, as he staled enormously every time he stopped.

I now commenced giving him a ball containing two drachms of ginger and three of gentian, daily. On the second day, he began to eat more and drink less ; and by the time we had administered six balls, he had lost his morbid appetite for water, ate as usual, and has since been sold for £90.

To have seen him in the stable, without knowing any thing of the case, or the accompanying symptoms, the disease might have been mistaken for inflammation of the kidneys or bladder ; for he was either staling, or endeavouring to stale, the whole time he was in the stable, more particularly just after he had drunk ; and I am inclined to think, that if there was no predisposition to disease in the kidneys, they would not so readily have adapted themselves to the great demand made on them by the enormous influx into the system ; not only carrying off easily all the water he drank, but also the aqueous portion of the blood which had formed a dropsical deposit in the hind legs. On the other hand, if it were the tonics that aided the cure, it implies a morbid state of the stomach, producing preternatural thirst. I have, however, stated the case as it occurred, and should like to have or hear of another of the same kind, the treatment of which would, perhaps, throw some light on the nature of the malady.

To what we are to attribute this unnatural or morbid thirst—whether to any disordered state of the kidney,^s or a derangement in the functions of digestion, appears problematical. It would seem to be connected with *some* morbid condition, since so long as it has, in the cases related of it, continued, the animal has fallen off in his appetite, spirits, and condition, and has not regained them until his excessive craving for drink has been allayed. There appears no risk, in such a case, of harm resulting from allowing the patient his fill of drink—no chance of his “*bursting*,” or over-sweating, or even purging ; for the water is carried out of the system by the kidneys almost as fast as it is received into the stomach. Here, then, is a disease consisting—as far as we know—in *morbid thirst* : let us now

consider that affection whose prominent or only symptom, is—

POLYURIA OR PROFUSE STALING: Such only being regarded in the light of disease when it amounts to great excess in quantity, and when it continues for such a length of time as causes the well-being of the animal to be evidently affected by it.

The **CAUSES** for this must in general be sought for either in the provender the horse is feeding on, or the water he is drinking. Mr. Rendle, of Belmont Road, Guernsey, wrote to me in July, 1843, for advice about some horses attacked with what he called diabetes, one of which died; and which he at length discovered to be owing to *stagnant water*. Dark-coloured, highly fermented, or mow-burnt hay; kiln-dried, called foxy oats, or such as have speared or become musty from laying long in heaps; barley which has malted, and water having some mineral or diuretic impregnation, are each and all of them to be viewed in the light of injurious agents, notwithstanding they are consumed in many cases with impunity.

During the three years of occupation the British army continued in France, after the battle of Waterloo, Mr. Castley, V.S. 12th Lancers, had occur to him some well-marked cases of this description. They arose from the unwholesomeness of the oats served out to the cavalry, which were issued from stores where they had lain in such enormous heaps as in a short time not only to heat, but to become “literally half rotten.” This at one time caused diabetes (insipidus?) to a “frightful extent.” Mr. Castley endeavoured to check it by giving chalk in water. For common use, Mr. Castley generally found the following formula satisfactory:—Take of powdered galls, alum, and bole, of each $\bar{3}$ i, ginger $\bar{3}$ i, and mix them in a quart of beer; or give them, divided into two parts, in balls, morning and evening.

The **SYMPTOMS**, in ordinary cases, attendant upon these immoderate fluxes of urine are—insatiable thirst, with, unless this be appeased, a refusal to feed as usual; unhealthy

appearance of the coat; dispiritedness; inability to bear fatigue; loss of flesh; debility and its consequences.

Mr. Stewart, of Glasgow, in a paper on this subject, in 'THE VETERINARIAN' for 1839, describes two kinds of this disorder: one with, the other without, fever and bronchitis; the symptoms in the latter case being that of fever with bronchitis superadded. He also avers that he has seen the disease occur when no cause for it was discoverable in the food.

The quantity of urine voided in some of these cases is so great as to be quite incredible.¹ The stall is deluged with the flow. In an account of the disorder as it occurred at one time in France, M. Lassange informs us, "the horses attacked voided five or six pints of perfectly clear urine every hour."

THE QUALITY OF THE URINE is that of *urina potus*. It is thin and aqueous, and perfectly transparent. According to Lassange, 100 parts of it contain—of water, 98·0; of urea, of benzoate, and acetate of potash, of acetate of lime, of chloride of sodium, and of free acetic acid, 1·5; of mucus and sulphate of lime, 0·5; making it to differ from healthy urine, 1st, in containing a larger quantity of water (for healthy urine has but seven eighths of water²); 2d, in the presence of acetic acid, which is in part free; 3d, in the absence of any earthy carbonate, which in healthy urine abounds. No saccharine matter was detected.

THE TREATMENT of these cases appears, in the majority, to be rather dietetic than medical. Strict inquiry ought to be immediately set on foot into the nature and quality of the food the horse is eating, as well as into the kind of water he is drinking; one or both of which—unless any other cause can be shown for the origin of his complaint—had better be immediately changed. Should the horse be

¹ Mr. Charles's case, and that of my father, furnish proofs.

² This proportion of water accords with Professor Brande's analysis of horse's urine. He found carbonate of lime, sulphate of soda, muriate of soda, benzoate of soda, and phosphate of lime, amounting altogether to one eighth of the fluid analysed.

attacked during the spring or summer season, a very desirable change would be from the stable to the grass-field; or, when this cannot conveniently be done, soiling, *i. e.*, feeding on green meat, such as vetches or lucern, or, early in the season, rye-grass, may be practised with advantage. Should the water appear to be in fault, and there be no means, or very great difficulty of obtaining any other kind, we may put a piece of chalk into the pail he drinks out of, with a view of neutralizing or rendering less harmful the noxious impregnation.

The medicines found most serviceable in this disorder are astringents and tonics. A ball I am fond of myself is composed of sesqui-carbonate of iron and prepared chalk, of each half an ounce, made up with syrup, and given once a day. Mr. Castley appears to have derived benefit from galls. Mr. Stewart speaks in laudatory terms of opium. He gives daily a ball consisting of three drachms of opium, and of catechu, gentian, and ginger, two drachms of each, made up with a little tar. The late Mr. Bird (V.S. 8th Hussars) informed me he had seen the *Ura Ursi* (in 3ij doses) "act like a charm" in arresting and removing inordinate discharges of urine. He had been giving for the complaint catechu and opium, and had, by way of experiment, added the *Ura Ursi* to the balls.

Should any fever exist, such medicines, of course, become inadmissible. In their place, moderate bloodletting and purging ought to be practised. In case the urinary disorder outlive the febrile one—which it will not often be found to do—recurrence may then be had to the opiate and astringent remedies.

ALBUMINOUS URINE.

To this subject my attention was first drawn in December, 1838. An officer's charger, six years old, thoroughbred, who, before he came into the possession of his present owner, had been much used, and had obtained a good character as a hunter, exhibited some rather strange symptoms, respecting which my first impression was that he might have sprained

his loins under too heavy weight in the riding-school. With a view of shedding some additional light upon his case, I desired that some of his urine might be caught; and this circumstance it was that at once unravelled the nature of the disease of which he was the subject. The urine proved to be light-coloured, but very thick in its consistence; in fact, it was, when poured into a glass, very much like so much melted calf's-foot jelly. I lost no time in consulting some of our best works on human medicine on the subject, and soon learned that the case must be one of "serous or albuminous urine," a conclusion in which I became afterwards confirmed by the application to the fluid of the usual tests. Since this I have noticed two other cases.

The SYMPTOMS observed in one slight case were, a continual desire in the horse to stretch himself out in his stall, and in this position to continue, with his fore legs extended under the manger and his hind ones backward, unless disturbed, all day long; not for the purpose of staling, but apparently because that posture seemed an easy or a comfortable one to him. In another case, the horse stood in his stall "all of a heap," with his back roached and his hind legs advanced underneath his body. Led out, the animal in his gait evinces stiffness in the back and loins, which is most manifest in turning round. There is some fever attendant; but this, in a slight case, will but amount to some heat of mouth and acceleration of pulse, without materially affecting, perhaps, either the spirits or the appetite. In a severe attack, however, there will be rigors, and a great deal of irritation, manifested by accelerated respiration, by loud blowing or puffing at the nostrils, by anxious countenance, and small quick pulse; combined with extreme disinclination to move, and great pain and difficulty in progressing and turning the hind parts. The bowels are commonly confined.

The state of the urine, however, must constitute our diagnosis. The groom must seize the earliest opportunity to collect some. Should it prove albuminous, it will assume a deep or dead straw-colour, and be found of the consistence

of a thick solution of gum. Submitted to the test of bichloride of mercury, it will yield a copious milky flocculent precipitate, resembling white of egg; and in some cases—not in all—the albumen contained in it will coagulate on exposure of the urine to heat: when this last test fails, I take it the failure is attributable to the large quantity of water with which the albumen is united. Its coagulation, however, may still be effected by adding a little acetic acid, and afterwards some prussiate of potass.

The adult period of life seems the time at which we are to look for this disease. My patients were aged six, seven, and eight years.

RELAPSE took place in one instance. The first attack, but slight, happened in April 1839; the second, very severe, occurred in March 1840.

During cold weather the disease has appeared. I have had no case in summer.

PATHOLOGY.—Dr. Blackall, many years ago, directed the attention of the medical world to the albuminous condition of the urine in dropsy, regarding it as an indication of inflammation and a guide to the practice of venesection. But with respect to the same alteration in the urine occurring as a sign of diseased kidneys, it would appear we are indebted to—

Dr. Prout, who, in one of his Gulstonian Lectures¹, thus expresses himself on the subject: “*Albuminous Urine*, or that variety termed *chylous urine*, I believe was first distinctly described by myself in my little work on urinary diseases.”—The leading properties in this urine are, “that in general it so nearly resembles chyle in all respects, as to be scarcely distinguishable from it; that it occasionally passes on the one hand into blood, and on the other into lithate of ammonia; that the chylous state is generally found to be more marked two or three hours after eating, while in the morning it is sometimes nearly absent; lastly, *that its specific gravity little exceeds, and sometimes does not equal, that of healthy urine*; so that, unless the quantity of urine

¹ These lectures are re-published in ‘The Veterinarian’ for 1831.

be inordinate, which is sometimes the case, the drainage from the system does not much exceed that of health; a circumstance accounting in some degree for the little constitutional disturbance generally produced by this affection."

This last statement does not hold good in regard to the horse. Most of the urine I have seen, during the continuance of the disease, has greatly exceeded in specific gravity healthy urine.

Dr. Prout, from his cases, concludes that the disease occurs equally in males and females; before and after puberty; occasions more or less emaciation; may continue many years, more or less, without affecting the constitution; the appetite being generally good, sometimes inordinate; and there being evidently an inflammatory tendency in the system during its progress, which is benefited by bloodletting. In the chronic stages, the Doctor has found the complaint yield, for a time, completely to opium, astringents, and mineral acids; whereas, in other instances, these and all other tried remedies have failed. Sometimes the complaint ceases spontaneously, and occurs again after a long interval (as it did in one of my horses); and when it has once occurred, it appears to be very liable to return, particularly after exposure to cold, or any cold producing fever. In general, the Doctor has observed that all stimulating remedies and powerful diuretics and tonics do harm.

Lastly, the Doctor asks, "what is the intimate nature of the disease?" and answers, that, "like that of all others, it is obscure." The Doctor thinks it cannot be doubted "that both the assimilating organs and the kidneys are involved in the affection. The chyle, from some derangement in the process of assimilation, is not raised to the blood-standard, and, consequently, being unfit for the future purposes of the economy, is, agreeably to a law of the economy, ejected through the kidneys: but these organs, instead of converting it into the lithate of ammonia, permit it to pass unchanged. That this is a sound view of the matter, cannot, I think, be doubted; for if the chyle was properly converted into blood, this fluid, and not chyle, ought to be thrown off by the

kidneys. On the other hand, it may be stated as an argument in favour of the notion that the kidneys are affected, that chyle has often been found in the blood when the urine was entirely free from albuminous matters; shewing that, in the healthy state of these organs, even though chyle does get into the sanguiferous system, it is not necessarily ejected, or, if it is, that it undergoes the usual changes in passing through the kidneys. This affection of the kidneys, however, like that in diabetes, does not seem to amount to organic disease, at least to such as is cognisable by the senses."

Dr. Elliotson, in his Lectures¹, expresses himself as follows on the subject before us: "With regard to the albuminous state of the urine, we are indebted to—

"Dr. Bright for the fact, that, in organic disease of the kidney, the urine is generally in this albuminous state; that is to say, contains serum. And that ANDRAL, in his 'Chemical Reports,' had previously mentioned a case where he found the urine albuminous and the kidney in a granulated state. He simply mentioned the fact. He had no more facts, and he came to no general conclusion, nor would he have been justified in doing so. But Dr. Bright has collected a large number of cases, and he has found that, when the kidney is in a disorganized state, the urine is generally albuminous. He does not say (so far as I can understand his book), that when the urine is albuminous the kidney *must* be in a state of organic disease; for he says, that sometimes he has seen it only gorged with blood. But still, even here, the kidney was *affected*. Some have gone further than this, and, I think, without any reason whatever. They would have us believe that nobody can have albuminous urine without organic disease of the kidney. Now I really cannot subscribe to this assertion; and for this reason: I have seen patients who were perfectly well a day or two before, but who have got wet through; symptoms of inflammatory dropsy have come on; the urine has become albuminous; but on bleeding them the dropsy has presently been got the better of, and the

¹ Edited by Dr. Rogers, and published in 1839.

urine has recovered its healthy appearance. Why these poor people should be supposed to have had diseased kidneys merely because they had albuminous urine for a week, I cannot imagine. It is a mere assumption, I think. I could not open them, to ascertain whether their kidneys were diseased ; but as they are in perfect health now, and had been in perfect health just before, and the urine is no longer albuminous, I do not believe there is any more foundation for supposing the existence of organic disease, than there is for supposing that cancer of the stomach is present in every case of temporary dyspepsia, because, when people *die* of dyspepsia, we find more or less organic disease.

Hundreds of persons, in different ages, have pined away, and died without their disease or cause of decay being known, or with their cases falsely called liver, brain, dropsy, &c., until the genius of a Bright discovered the real cause of mischief in the disease or disorder of the kidney—the *morbus Brightii*—which, though little striking, is sufficient to spoil the secretion of the organ, and send one of the most noxious excretions—the *urea*—which should be discharged with the urine, back through the frame to poison the springs of life, and thereby agitating and paralysing every function.

It is the business of those who make these assertions to prove their correctness ; to prove that these persons have organic disease of the kidney, and not our business to disprove it. Because, when a person *dies* making albuminous urine, you always find structural disease of the kidney, it does not follow that, when the urine temporarily presents the same phenomenon, and the person recovers, he has had anything more than a functional complaint. Because the affection of the kidneys may arrive at such a degree of intensity as to destroy life, and you then always find organic disease, it does not follow that the *temporary* formation of albumen should be anything more than a functional disturbance of the kidneys. I should draw just the opposite conclusion ; and should suppose that, if the symptoms were temporary, the disease must be functional. Dr. Mackintosh informed me, that some medical students in Edinburgh had

lately ascertained that, when they ate pie-crust, and it produced dyspepsia, their urine became albuminous. They made this experiment over and over again; and the circumstance is nothing more than I should expect.”¹

These medical quotations shew us how long, and how much the present subject has engaged the attention of some of the most eminent physicians of our own day; at the same time, they appear to demonstrate to us, that albuminous urine may exist without organic disease of kidney—may be the result of simple functional disorder of the gland—may even proceed from indigestion—nay, from disease of liver. All these are facts, however, which we, as veterinarians, must receive *cum grano salis*. We must regard them only as starting-posts from which we may safely set off on our inquiry, and which may prove to be fast grounded or not on further investigation. We know how little the horse is the subject of dyspepsia; we know how less still his aliment is varied, or of that kind likely to render him so: we have, consequently, stronger grounds than surgeons for believing that this change in the urine is the effect of some altered state, functional or organic, of the kidneys. I would, therefore, still counsel the veterinarian to continue to regard the appearance as an important aid, on occasions, in directing us to a safe and sound diagnosis;—as, in fact, connected with other collateral evidence, amounting to a proof that the kidneys are the seat of the animal’s complaint.

My treatment, where symptoms of inflammation have distinctly shewn themselves, either in the form of constitutional irritation or locally, has, in the first instance, been antiphlogistic. I have both bled and purged moderately, and applied upon the loins, in cases of much tenderness and stiffness there, mustard plasters, taking care to sponge them off with warm water before they have taken so much effect

¹ “Dr. Graves, the eminent Professor of the Institute of Medicine in the School of Physic in Ireland, has done much to dissolve the supposed invariable connexion between albuminous urine and disease of the kidney. He shews that it often depends on disease of the *liver*.” See his valuable papers in the ‘Dublin Journal of Medical and Chemical Science.’

as to endanger the separation of the hair. So long as any febrile action continues to be manifested, the depletive plan, with attention to diet and abstinence from exercise, will be found most beneficial. Afterwards, the best moderator or corrector of the argumented or morbid secretion will be found to be *opium*. I have tried the stimulating diuretics, cantharides and tincture of muriated iron; but I find they do harm. One circumstance should be mentioned here, and that is, the continuance, from habit, of the stretching out of the legs in the stall after the complaint is removed, which, were it not for the return of healthy urine, together with the perfect restoration of the horse's action, would induce us to believe the disease remained.

Mr. Clayworth, V.S., Spilsby, transmitted to 'THE VETERINARIAN,' for 1836, a case for an opinion, connected, I now believe, with the subject we are considering. It is this:—

In October, a bay blood mare, then running in the mail, began to fall off in condition, in consequence of which she was turned into a loose box, where she rapidly regained flesh and spirits. A fortnight afterwards she was taken to exercise previously to being put to her former work. She appeared in perfect health, and very playful. She had proceeded with her rider about half a mile, when she suddenly stopped, began sweating and trembling without any apparent cause, and was with difficulty led home. Mr. Clayworth was sent for—found her sweating and trembling, and scarcely able to turn in the stall; the muscles of her back and loins in a state of spasm; tail quite stiff; kept looking at her flanks, and appeared in violent pain; dropped her hind legs in going forwards; but her loins did not appear tender when pressed upon. (In the rigid spasmed state in which they were, it is not likely they would.) About a pint of fluid was drawn from her bladder with the catheter, *of the colour and consistence of linseed oil*; after that, the same quantity, thicker and of the colour of porter; and a third portion of the colour of whey. These urines passed in succession, the catheter remaining all the while in the bladder.

That the urine resembling linseed oil was albuminous,

there seems little doubt; that the portion resembling porter was mingled with blood, subsequently and slowly trickling from the kidney, appears probable; but why this should *suddenly* change, and become like whey, I must confess I do not pretend to offer an explanation.

HÆMATURIA.

Hæmaturia, or bloody urine, is a complaint every now and then made to us. When such a case does present itself, our grand aims must be, first, to find from what part the blood issues; secondly, to discover the cause of the hemorrhage. Blood may either come away alone, and shew itself in its pure form, by coagulation, or it may be discharged mixed with the urine, and then either only in part or not at all congeal. Under such circumstances, the urinary discharges are generally scanty; but sometimes they are very frequent, and troublesome as well. It may be difficult or impossible to say where the blood is coming from; whether from the kidneys or the bladder, or from any of the passages. Examination both *per rectum*, and externally upon the loins, and about the penis, may not go far to clear up this point: we must, for the rest, be guided by the symptoms, and by what account we can collect of the occasion or history of the malady. It may proceed from inflammation, or from some disorganization either of the kidneys or the bladder, or it may arise from calculus: it is most likely to prove to be the result of some sprain or blow, or some injury of the organs. In old horses the disease is likely to prove the consequence of long-standing chronic disease of the kidneys, brought into fresh action by some severer or more straining work than usual.

The TREATMENT must be entirely under the control of circumstances. Staling of blood may be—indeed generally ought to be regarded as—a dangerous omen. Should injury have produced it, we must keep our patient as quiet and as free from all sources of disturbance and irritation as possible, and medically treat the case as it shall seem to require. Should febrile or inflammatory symptoms arise, they

must be subdued or moderated ; and if present in the kidney, counter-irritation upon the loins may be employed ; taking care not to employ cantharides, or any other diuretic stimulant. When no inflammation is present, and none apprehended, but the case assumes what is called the passive form of hemorrhage, we may try the effect of internal styptic and sedative medicines, and the best appear to be those used in human medicine under similar circumstances—oil of turpentine and opium.

Mr. Brown, V.S., Melton Mowbray, has been very successful in the employment of the acetate of lead, in combination with opium and a vegetable tonic, formed into a mass with balsam of copaiba and syrup. His excellent practical paper on this infrequent occurrence in the common routine of practice, contained in 'THE VETERINARIAN' for 1854 (vol. xxvii. p. 13), is well deserving of attentive perusal.

The late John Field has left us some interesting observations on this subject. A horse was brought to him, Jan. 1818, that had come off a job for "profuse staling of blood;" he lived three days, continuing to grow worse, and then died. "The peritoneal coat and cortical substance of the kidney were entirely destroyed; the ureters filled with blood; the bladder contained a pint of blood, mixed with urine; the liver was pale; the chest healthy. Above a pint of blood was found within the pericardium."

"Another horse died, 10th Feb. 1818, of similar disease. The ureter and kidney of the near side were much enlarged; the former and pelvis of the latter were filled with blood, arising from destruction of the texture of the papillary substance; the off kidney was not so much enlarged; its ureter was likewise filled with blood, and there was a very small abscess within its substance."

Nov. 1823. A bay gelding admitted for staling of blood in such quantity as almost to exhaust him. The lips and conjunctivæ quite pale; pulse weak and frequent; fainted twice during the day; died at 12 o'clock the same night. The bladder proved full of blood. Ulcerated tubuli uriniferi, and pelvis of the left kidney; of the right the cortical part

was brown and flabby, it had lost its normal texture. (Remark.) "In most subjects dying of this kind of the disease, it is usual to find the hemorrhage proceeding from that kidney least affected with the disease externally, and also, to find but one kidney ulcerated internally. The staling of blood is the first symptom noticed."

Oct. 1829. An old black mare had been for some time falling off in condition and appetite, though suffering no pain, and was galloped without affecting her breathing; after much riding, however, she went weakly behind; and in the stable, after staling, she voided a small quantity of pus with blood. Examination *per rectum*, discovered a large tumour near the left kidney, extending back to the groin. On the 3d Feb., 1840, the mare died from superpurgation; the intestines had the "deeply discoloured appearance, with congestion of the capillaries, without thickening, which is usual in hypercatharsis. The left kidney (the tumour felt) was greatly enlarged, and contained much pus in schirrous cysts.¹

DIABETES.

The term is here restricted in its meaning to denote that kind or form of disease in which *sugar* is found to be present in the urine, at the same time that the urine is—for it generally is—existing in much greater quantity than in health. I have some recollections of having witnessed a case of diabetes while a pupil at the Veterinary College, and of sugar being detected in the urine; but having made no notes at the time, I am now left in doubt about it. No English author, nor French one whom I know, gives any account of the disease that can be relied upon as a test of its having come actually under observation in practice. Some well-authenticated case of it—should such occur—would really prove a boon in hippopathology.

"In no disease is chemical science likely to prove so useful as in diabetes. Willis was the first to perceive the sweet

¹ Mr. Field's 'Posthumous Veterinary Records,' 1843.

taste of diabetic urine; and Cruikshank and others subsequently demonstrated the saccharine principle on which that property depends. That sugar exists in the blood of diabetic patients has been proved by Abrosiani and Messrs. Maitland and M'Grigor—especially by the latter. By coagulating the albumen, Mr. M'Grigor had no difficulty in procuring sugar from the serum. And he then found that the sugar was formed in the stomach during digestion. And M. Bouchardat has since shown that “the fixed proportion of sugar in the urine is in constant relation with the fecula in saccharine matter in the food.”

In man, some startling and very curious observations have been recorded concerning it. One very remarkable symptom—and one which Dr. Elliotson says he never found to be absent—is the loss of sexual power and desire. Another is, that the quantity of urine voided has been known to amount to double that of the fluid drunk: indeed, some cases are on record in which every day forty pints—in some days fifty—were discharged. A third is, the urine has a sweet taste, and by evaporation yields about an eighth of thick residue, from which sugar is extractible to the amount of about two-thirds of the weight of the residue. And in consequence of this saccharine impregnation the urine has been found, by the addition of yeast, to be susceptible both of the vinous and acetous fermentations.

URINARY CALCULUS.

The comparative rarity of the occurrence of calculi among horses is well demonstrated by the meagre state of our literature in regard to them, though the mention of “Stone” among veterinarians of the present day does not amount to what it did, as a *rara avis*, some years ago. I shall, from the scattered cases of such occurrences on record, and from the accounts furnished by our continental brethren, endeavour to frame such a connected history as will enable my reader to recognise and properly treat such a case, should one happen to cross his path in practice.

KINDS.—There are four situations in which calculi may be formed, or rather in which they have been discovered, viz. the kidney, the ureters, the bladder, and the urethra; and this has given rise to a distribution of them into *renal*, *uretal*, *cystic* or *vesical*, and *urethral calculi*: a classification, be it observed, having no reference whatever to their compositions.

RENAL CALCULI.

These are commonly lodged within the pelvis of the kidney; though both in horses and men the *infundibula* have been found filled with them. Several of our veterinary museums contain specimens of renal calculi. A very fine specimen was in the possession of the late Mr. Ainslie, weighing twenty ounces, and occupying the entire pelvis of the kidney: unfortunately, no history is attached to it, the late Mr. Youatt having perchance purchased it from a knacker. One larger still, weighing twenty-five ounces, was sent to the Veterinary Association by Mr. Bowles, V.S., Cambridge. "The subject of it," Mr. Bowles writes, "was a post or coach horse, who was frequently attacked with symptoms which were scarcely distinguishable from those of spasmodic colic: in fact, he was always treated for that disease, and as frequently recovered. The animal, at last, died suddenly, after a severe day's work, when, on opening him, the existence of the calculus was discovered. Of course, nearly the whole of the kidney had become absorbed so that the other kidney, which appeared usually healthy, now performed the functions of two."

Renal calculi, according to D'Arboval, exhibit two principal varieties. One set are hard and compact; have a mingled yellow, green, and dirty white hue; with a form, not invariably but commonly, identical with that of the pelvis; are composed of regular layers; and, when sawn through, discover a central nucleus. The other set are areolated and tuberculated, rough and grained upon their surfaces, and not so hard, nor so compact or weighty, as the former, and have an agglomerated composition.

SYMPTOMS.—We appear to be without any that can be

depended upon. In the early formation of the stone in kidney, and for the most part during its increase, it would appear that little or no inconvenience—certainly no expressed pain—is occasioned by it. When it becomes weighty, however, and fills up the pelvic cavity, it must create considerable impediment to the flow of urine, as well as prove a source of more or less annoyance and irritation, which is likely to be manifested from time to time by symptoms undistinguishable, perhaps, from those of “gripes;” though this irritation probably is in some degree lessened, perhaps altogether counteracted, by the hypertrophy of the cavity containing it keeping pace with the incrementation of the stone; and this is accompanied by dilatation of the infundibula as well, and by general augmentation of the gland itself. These changes are often attended by inflammation and suppuration. Purulent matter pervades, and in time fills, all the canals and cavities; and sooner or later the subsequent work of disorganization commences, and absorption of the substance of the gland follows; first of the medullary, and afterwards of the cortical composition, in a greater or less degree, until the deformation ends only with the destruction of life. Periodical colics, with expressions of extreme suffering, and these coming on after exercise or exertion of any kind, and again ceasing as suddenly as they appeared, leaving behind them sedimentous and gravelly urine, are what D’Arboval has offered as the symptoms denoting this state of kidney. The condition of the urine might certainly lead to a suspicion of stone, and the absence of any in the bladder or urethra might induce us to assume the presence of one in the kidney.

Our TREATMENT must be directed to the mitigation of irritation, and any consequent febrile disturbance. Blood-letting and purging; fomentations, and mustard plasters to the loins; clysters; and the subsequent exhibition of acids—the acétous is one of the best—with a view of dissolving or rendering unirritating the calculous matters. Purgatives during the intervals of ease are also recommended, on the ground of the commotion in the bowels produced by their action being likely to cause a descent of the calculus.

URETAL CALCULI.

These are stones which have passed from the pelvis of the kidney into the ureter, and there, on account of their size, have remained fixed. They are of still rarer occurrence than the former. Chabert asserts that such, when they exist, may be felt with the hand introduced into the rectum; and that we have nothing more to do than to cut through the gut and ureter in order to extract, or, at all events, to dislodge them. Supposing both ureters to be plugged in this manner, of course there would be a complete suppression of urine. I might lengthen this account with further suppositions without affording much useful or practical information: it will be better, perhaps, to acknowledge the case to be one of that exceeding rarity that, practically, we know but little about it.

CYSTIC OR VESICAL CALCULI.

Of these we find many cases standing on record, both in our own veterinary annals and those of the Continent; and we are farther aided in our researches by an excellent little pamphlet on the subject penned by the late distinguished professor of the French school, M. Girard, as well as by a small work of good service to veterinarians on the subject of 'Calculous Concretions,' by Professor Morton of the Royal Veterinary College, who, at the commencement of his inquiry into "urinary calculi," makes the following sensible observation respecting the frequency of this occurrence among horses:

"Although I have questioned the frequency of the existence of calculi in the lower animals as compared with man, I at once express my firm conviction, that they are nevertheless present in them more commonly than is thought; nor is this to be wondered at, when the functional relationship which exists between the kidneys and the skin is borne in mind, coupled with the alterations in temperature, and many accidental circumstances, such as injuries, &c., to which the horse

more particularly is exposed. I come to this conclusion from the multiplied specimens which are being continually brought from the horse-slaughterers' yards to the college; and, on inquiry being made, in very many instances, we have not been able to ascertain that, during life, the animals showed any symptoms indicative of their presence. This may, in a great measure, arise from the want of observation on the part of their owners, or from the symptoms having been mistaken for those of spasmodic colic. It is, however, sometimes the case that indubitable proofs are afforded of the existence of these foreign bodies; still the poor brutes, notwithstanding, have been compelled to lengthen out a miserable existence, until, exhausted by pain, they have become so feeble as to be altogether incapable of further labour."¹

Some of the stones found in the bladder were no doubt originally renal calculi; i.e., formed within the kidneys; others there are, however, which we believe to be originated, and to receive their augmentation entirely within the bladder. The late Professor Coleman was of opinion that most calculi had their primitive formation within the kidney; and that in man, owing to his erect attitude, they readily descended into the bladder; but that it was quite otherwise in the horse, owing to his horizontal position; and this circumstance, he added, rendered cases of renal calculi comparatively frequent in horses. D'Arboval entertains a different opinion—"quelques unes descendent des uretères; mais c'est le plus petit nombre."—Professor Morton says, "The origin of all cystic concretions may be traced to the kidneys; at least there their nuclei, when present, are first found. From the horizontal position of the bodies of our patients, these do not find their way down the ureters into the bladder so readily as in man; hence renal calculi are more frequently met with in the lower animals than in him."²

Of kinds or varieties of vesical calculi, according to Girard, there are four: The *first*, or *soft kind*, comprising

¹ 'On Calculous Concretions in the Horse, or Sheep, and Dog,' by W. J. T. Morton, Lecturer on Medical, Chemistry, &c., 1844.

² Op. cit., p. 20.

the earthy inspissations, are soft like paste, but grow firm towards the centre. *The second kind* are yellowish or whitish calculi, with rugged, grained, or simply fretted surfaces, composed of an irregular mass of more or less coherent saline material. Some present areolated interiors, and exhibit different degrees of hardness in their composition. *The third kind* are formed of concentric plates, and are void of any central nuclei; they are commonly gray, fretted upon their surfaces, and harder than the foregoing sorts. In some of these the saline materials are found much less compact in the centre than towards the circumference. The fourth kind is *the calculus with nucleus*; of which there occur two varieties: one composed of concentric plates, as hard almost as flint, with a wall-like kind of surface; the other less compact, with a granulated exterior and a diversified areolated interior.

In the year 1839, Mr. G. Baldwin forwarded to the Veterinary Association (then in existence) a quantity of subulous matter weighing eight pounds and a half, which he had taken from the bladder of a horse, destroyed for old age. During life no urgent symptoms presented themselves; the animal was observed to urinate frequently, and sometimes the urine would be interrupted in its flow.

CHEMICAL COMPOSITION.—Urinary calculi taken from horses have been found by Fourcroy and Vauquelin to be as remarkable for the uniformity of their composition as those obtained from the human body have proved for their strange diversity and variety in this respect. Classifying human urinary calculi according to their different constituents, no less than eleven kinds are described as being at times met with; whereas, in horses, taking the same mode of classification, no more than one kind can be said to be produced. Horses' calculi have proved uniformly to consist of *carbonate of lime*, and a very small proportion—one-hundredth part—of *carbonate of magnesia*, mixed up and cemented together by an animal matter found to be *mucus*, mingled in some cases with *albumen*. “By far the greater number of calculi found both in the horse and ox are composed principally of the carbonate of lime and animal matter. In a few I have

detected the phosphate of lime, and in some, traces of the ammoniate-magnesian phosphate.”¹ The carbonate of lime is soluble with effervescence in the weakest acids; and this is an important fact to be acquainted with, because it leads to the suggestion of the medicines best adapted to—if any will—work some solution or diminution of them. As a rare exception to this unvarying composition, M. Lambert mentions an instance where a calculus so large was discovered, that it completely filled the bladder, which was found to contain a pretty considerable proportion of oxide of manganese.

The SYMPTOMS in the early stages of the formation of calculus are, in general, either of a nature too trivial to attract notice, or they are of that indefinite character, that we are unable to draw from them any practical or safe deductions; and either of these states may continue for an unlimited length of time—years even.

These indefinite or suspicious symptoms, according to D’Arboval, are—“Less freedom in the movements of the hind quarters; lying down less, or reposing with the fore parts raised from time to time, seated upon the croup; frequent motions of the tail; the state of the urine—its growing by degrees thicker and whiter, and depositing, on standing, a sediment of the same nature as the composition of the soft or first kind of calculus; frequent desire to stale, and difficulty and pain in accomplishing it. In some cases, the walk will be tardy and straddling; the loins roached and stiff; the urine acrid and irritating; and the sheath or perineum tumid. At Alfort College it has been remarked that the penis sometimes becomes paralysed, and hangs out of its sheath.”

More characteristic symptoms “are likely to arise at the time that the urinary concretion begins to assume the solidity and hardness of a true calculus, in consequence of the irritation produced by it upon the membrane of the bladder; though in general”—according to the same author from whom I am now transcribing—“the pains are not

² Op. cit., p. 19.

great, except at the time that the calculus gets into the neck of the bladder, obstructing the passage, either partially or completely, and occasioning more or less difficulty in staling, or altogether preventing the act. The irritation set up causes frequent desire to stale, and to satisfy this the horse is continually making efforts, violent in proportion to his feelings: he stretches himself out and draws his yard, but often in vain, or with ability only to dribble a little, and that with extreme pain. What he does pass is perhaps bloody, perhaps gravelly. The urinary irritation may induce colicky pains; in which case he will try to strike his sheath with his hind feet, and will look at his flank, grind his teeth, and shake his head from pain: in fact, during suffering, he may manifest all the worst symptoms of acute enteritic disorder. In their agony, mares have been known to expel their calculi, and in this manner effect their own cure. A horse has stopped himself all at once in his gallop to make water, and, being unable to accomplish the act, has refused to set off again. The animal can stale only at such times as, through relaxation of the bladder, the stone has fallen into its fundus. Towards the termination of this painful disorder, a horse has been known to experience seven or eight paroxysms of pain daily, and at last sink through extreme suffering. On the other hand, cases occur wherein calculus is breeding fatal mischief for years, and the horse feeding and working and looking in health all the while, even up to the day of his death."

EXAMINATION PER RECTUM—a mode of inquiry known even to Vegetius—is the veterinarian's grand confirming test of the presence of calculus: it may be said to constitute his *diagnosis*, for it will assuredly resolve all his doubts and apprehensions, and, moreover, can be easily and readily practised without the risk of any injury to the patient. The most favorable moment for examination is immediately after the voiding of the urine; it being much easier to detect the stone in an empty than in a full bladder. Should the bladder be distended at the time, we may by pressing upon it endeavour to force some urine out; and if none

flow, it will probably be owing to the lodgement of the calculus within the neck, in which situation, by directing our hand more backward and downward, we may be able to feel the solid body, and possibly succeed in dislodging it, and pushing it backward into the fundus, and so occasioning a flux of urine. Should the stone have got so firmly impacted that we cannot move it, we must have recourse to a sound. In case we detect no calculus in our examination, and yet not feel satisfied in our mind that none exists, we must cast the horse, and examine the bladder afresh while he is turned upon his back. Should no stone be felt in this position neither, I should conclude there was none. I should not deem it worth while to *cut* into the urethra to sound the horse,¹ although I might pass a sound in the case of a *mare*; added to which, in the latter case, we have in our power the manual examination *per vaginam*, during which we may pass our finger into the meatus urinarius, and possibly actually feel the stone itself.²

The Consequences of Calculus remaining in the bladder are, inflammation producing cystorrhœa, thickening, induration, schirrus, ulceration of the lining membrane, extending through the outer tunics, and ending in rupture of the bladder and extravasation of the urine into the pelvic and abdominal cavities; the burst commonly happening at the fundus. D'Arboval speaks of meeting with calculi encysted within the bladder.

TREATMENT.—The existence of calculus being no longer an affair of doubt, the next question which arises is—how is it to be got rid of? We may take for granted that the basis of its composition is carbonate of lime; and upon this we know even weak acids make manifest impression. But acids, if given by the mouth, are found to undergo such change before they arrive in the bladder, that they no longer possess the power of acting upon the stone; and

¹ With Mr. Taylor's jointed sound, this operation may, possibly, be satisfactorily effected without cutting.

² See Professor Renault's operation for stone in a mare, in 'The Veterinarian' for 1835.

when injected at once into the bladder, they have proved irritating and otherwise hurtful in a high degree. Dupuy injected vinegar and water for a long while, but was at length compelled to desist in consequence of both the bladder and hind quarters being seized with paralysis. And of all lithontriptics, this, says D'Arboval, is in most repute. It has been ascertained at Alfort that it is capable of effecting the dissolution of calculi out of the body, the harder the stones the more acid being required ; some demanding equal parts, with an elevation of the temperature of the mixture to 90 degrees of Fahr. If ever success should attend this mode of treatment, it will probably be, as D'Arboval justly adds, in the case of *small* calculi. Professor Morton says in regard to it, "The acetic, nitric, or hydrochloric acid, may be successfully employed. I should prefer the last-named, from the fact that it is the same as that met with in the alimentary canal, although I believe either of the others would prove as efficacious." And the Professor makes relation of a case, in which the solution appeared to have succeeded, in the hands of Mr. R. Hutton, V.S., Great Yeldham.

The horse was eight years of age, and had for long suffered much difficulty in urinating, and of late had gradually fallen away. Mr. Hutton "detected two calculi in the bladder," in addition to subulous matter. His owner objecting to operations, Mr. Hutton at once determined to try hydrochloric acid ; of which he gave, at first, ʒiij of the acid in three gallons of water, which after a little difficulty, the horse freely drank. There being but little improvement after a fortnight, a purge was given, and in three days the acid had again recourse to, the dose now being ʒvj to three gallons of water, thrice a day. This had the effect ; a large quantity of calcareous matter was voided with the urine, and the appetite improved. The treatment was persevered in for four months, with occasional purging. The horse got well, and now "stands his work well."¹

Even under favorable circumstances, one would hardly,

¹ Op. cit., p. 48—50.

perhaps, recommend a proceeding so uncertain in its results, so liable to do harm, and so tedious and tiresome in its effects, when we have remedies at hand which are now brought, in human surgery at least, to such a degree of perfection that they are practised not only with certainty of cure, but with comparative safety. At the present day three operations are in vogue for stone; two have its extraction as their object; the other, the comminution of it.

DILATATION—without cutting—of the natural passages through which the urine is voided, may be said to be the simplest of these operations. It is practicable both in the male and female; but from its nature and effects is more especially suitable to the latter, in consequence of her urethra being short and nearly straight, and readily operated on. D'Arboval tells us that Henier, of Prague, has performed it upon a mare with success. And since, in our own country, Mr. Pope, of Aberdeenshire, has put its practicability and success to the test. In the case of one or more small calculi, this simple mode of procedure certainly ought to be preferred; and in the case of large ones, they may admit, first, of being broken to pieces. The best instrument for comminution appears to be the forceps constructed by Mr. Weiss of the Strand; only they would require to be made larger and longer than those used in human surgery. A dilator so constructed as to be used as forceps when the requisite dilatation has been effected, would, I think, be found a very useful instrument. Messrs. Field, I believe, have never in their operations, even on the male, had occasion to slit the urethra open: but have always succeeded by cutting down *in perineo* upon the grooved and curved end of a large straight metallic staff passed through the penis, and afterwards introducing a pair of large long-shanked forceps. This simplifies the operation very much, at the same time that it diminishes the risk of dangerous consequences. Some preparation of the patient and of the parts, by way of relaxation, would seem to be required to facilitate the dilatation; although, from the accounts given of it by surgeons, it appears to be an operation which may be either effected

in some minutes or may occupy some hours. In some instances, in order to expedite our proceedings, and enable us to dilate the passage with more effect, it may be requisite to slit up the urethra to some small extent: this became necessary in Mr. Pope's case. The safest instrument for this purpose is the *bistouri caché*.

LITHOTRITY—the crushing and comminution of the calculus—is an operation that has been and still continues to be practised among surgeons, some of whom, with the assistance of ingenious instrument-makers, imagine that it will one day or other save the pain of cutting for the stone; the late Mr. Liston, however, said—and this is authority we must all bow to—"I am not so sanguine as to suppose that the breaking up of the stone in the bladder will ever entirely supersede lithotomy."¹ Many lithotritic instruments have been contrived and recommended of late years; the favourite one of the present day appears to be that called the *screw lithotrite*, also an invention of Mr. Weiss. In human practice this operation, is recommended only for the adult whose urethra, prostate, and bladder are healthy, and in whom the calculus is below the magnitude of a chestnut: considerations which the veterinarian will find it his interest to keep in view. In a case of simple dilatation, should difficulty be experienced in drawing the calculus through the widened passage, it would be, perhaps, advisable to have recourse to the screw lithotrite; supposing the stone could not be crushed and broken in pieces, or be any how reduced in bulk by the common forceps; which, as I shall show, has been effected in several instances.

LITHOTOMY—rather *cystotomy*, inasmuch as its meaning is, cutting into the *bladder* to extract the stone—is an operation of very old date in the annals of veterinary practice; one of serious and dangerous tendency; at the same time one which has in several instances of late years been performed with complete success. Vegetius speaks of "horses being incommoded with the stone;" and gives directions "to put your fingers through the holes made in the rectum and

¹ Elements of Surgery, by Robert Liston, 1840.

bladder, and with an instrument to take out the stone.” And this is certainly the simplest mode of procedure; though, in regard to its effects, we are informed by Chabert, that he has on several occasions practised it with results too varying to advise its repetition.

There are still two other ways of cutting into the bladder; one, called *the high operation*—in veterinary practice it becomes the *low* one; the other, the *lateral operation*. The former is one now not at all in favour among surgeons, and for the same reasons—which it is not worth while here to enter into—cannot be safely adopted by the veterinarian; we will, therefore, proceed at once to the consideration of the *lateral* or ordinary operation.

THE EARLIEST ACCOUNT we have of an operation being performed in our own country is published in ‘The Farrier and Naturalist’ for 1829, from which I here extract it:—

“We have been favored by Mr. Randall, of Rotherhithe, with the inspection of a calculus, taken from the bladder of a horse about forty-six years ago. It now weighs five and a half ounces, has a rough and uneven surface, from which a portion has been chipped off, and its general outline approaches very near to the shape of an egg. The calculus belongs to Mr. Thomas Bidwell, of Swafeld, in Norfolk, and was taken from a horse belonging to his grandfather, which had been under the care of a farrier in the neighbourhood, named Miller, who considered the horse to be labouring under disease of the kidneys. The operation was performed by Dr. Shorting, then in surgical practice at North Walsham, and the horse lived for some time afterwards. Mr. Bidwell is unable to furnish the particulars of the operation, he being at the time quite a lad; but can recollect seeing the horse cast and secured in the orchard, and the stone extracted; from which time it has remained in the possession of his family and himself.”

The next account of lithotomy comes to us through ‘The London Medical and Physical Journal’ for October 1824, to which it appears to have been sent by the late Mr. White, V.S. 1st or Royal Dragoons.

Mr. Mogford, formerly a pupil and assistant of Mr. White’s, then in practice at North Lew, near Oakhampton, Devon, was sent for by James Veal, Esq., near Hatherleigh, to attend a horse, who, from being trouble-

some to break, had experienced very rough usage, and been hard ridden. There was a "peculiar stiffness in the movement of the hind legs; urine of a high colour and pungent smell, and a dribbling of urine from the penis for some time after staling." By venesection, clysters, fomentations, &c., he got sufficiently well to be sent to grass. He there leaped over a gate, which caused a return of his complaint; and Mr. Mogford was sent for again, and found him in the same state as before. This time Mr. Mogford examined the bladder through the rectum, and felt a hard substance which appeared to be a stone; in which opinion he was confirmed by Mr. Fisher, a surgeon of Hatherleigh. The following operation was performed: a whalebone rod was passed through the penis; the end of which, felt in the perinæum, was cut down upon, and through the opening thus made a director was introduced, "and with a probe-pointed bistoury the opening was continued as far as the left side of the anus." Mr. Mogford "then introduced his right hand into the rectum, and the two fore fingers of his left hand into the bladder, and without any difficulty pushed the stone against the middle finger, by which he guided it to the neck of the bladder, and then easily forced it out through the opening in the urethra. The stone weighed four and a half ounces.

These cases are, chronologically, followed by others occurring to Messrs. Sewell, Dick, Taylor, and Robinson. Mr. Sewell's—the late Professor's—case stands remarkable in our annals for having been sent to the *College of Physicians*, notwithstanding there were at the time of its occurrence two veterinary journals, as well as two veterinary societies, in existence; for which unfortunate predilection the physicians made the sad return of taking no more notice of the case than they would have done of any other horse or veterinary affair, and for which disregard of his own profession Mr. Sewell brought upon himself the censure of both veterinary journals and societies, as well as that, I am afraid, of a host of practitioners besides.

Mr. Sewell's patient was a horse belonging to the Hon. G. A. Broderick, twelve years old, that had been hunted for seven seasons, and up to the period of his admission into the Veterinary College. He had for some months passed very high-coloured and turbid urine, mixed occasionally with blood, and had expressed great pain in the acts. Aperients and light diet relieved, but work brought back his complaints. Suspecting calculus, Mr. Sewell examined the bladder per rectum, and "distinctly felt a firm roundish substance at the neck of the bladder, which was

empty and firmly contracted upon it." On a subsequent day Mr. Sewell renewed the examination, "when the bladder was nearly full," and could then "move the stone very readily." The horse was admitted a patient on the 14th of February. On the 26th "he appeared in a favorable state for the operation of lithotomy. The horse was accordingly cast and secured, turned upon his back, with his hind legs drawn forwards to the shoulders." The penis being drawn out, a three-foot whalebone staff was introduced as far as the perinæum, and the urethra opened by an incision about three inches in length. A grooved sound was then passed straight into the bladder, and the stone was distinctly felt, and heard on being struck. It was attempted to be extracted without cutting open the pelvic portion of the urethra and neck of the bladder, by being readily grasped with the forceps, assisted by pressure made upon the calculus by the left hand introduced into the rectum; but being too large, these parts were laid open by lateral incision, made with a strong curved and probe-pointed bistoury. It was then by the same means, but with considerable force, brought gradually forward to the perinæum, where it was forcibly contracted upon, and a farther extension of the external incision was necessarily made to effect its removal."—"The hemorrhage was not very great or alarming; but it was thought best to secure a perineal vessel with ligature."—"The calculus is of the mulberry kind, very rough, of a depressed oval form, weighing nearly three ounces. It has no distinct nucleus. Dr. Prout having obligingly undertaken to analyse it, found it composed principally of carbonate of lime, some phosphate of lime, and a little phosphate of magnesia." "The horse immediately after the operation became tranquil and cheerful, and the pulse by the evening fell to the healthy standard, and so continued until the following day, when, being rather agitated by numerous visitors, it rose to 38, and by night to 45. Four quarts of blood were taken from the jugular vein, a mild purge given, and frequent clysters."—"February 28, Pulse 40 and 44; bowels relaxed.—March 1, Pulse 44; purge and clysters repeated." The pulse continued down; and the bowels were kept open by aperient doses of aloes and clysters. The urine passed partly by the wound until March 2, on which day, the parts being healed, all of it flowed through the natural channel. The horse is daily exercised, and fit to be discharged."—"VETERINARIAN,' for 1829 from the 'Medical Gazette.'

In reply to a letter requesting to be informed of the result of this case, Professor Sewell kindly sent me the following particulars; and annexed to them brief accounts of two other cases which have occurred at the Veterinary College:

After being discharged on the 2d of April, the horse was turned out

for two months, affected, it was said, with an incontinence of urine. While he remained out the weather proved very unfavorable, and he gradually declined in health. In this state he was returned to his former owner, who had him destroyed the following July. The urinary apparatus was sent to the College for examination. The coats of the bladder were thickened, but, otherwise, healthy in appearance. The incision made through its neck, membranous part of the urethra, and perinæum, was quite healed. The right kidney and ureter were enlarged, and contained purulent matter, the consequence of the formation and descent of a fresh calculus, which was found lodged within the canal about three inches before its termination in the bladder. Its hardness and roughness, and irregular shape, appeared to have stayed its progress into the bladder. Some small calculi were also found within the kidney. To these irritations Mr. Sewell ascribes, sympathetically, the incontinence of urine.

The next case was a small thorough-bred horse—a racer. The calculus, which was about the same size and form as the preceding one, was extracted by a similar operation. He was worked regularly for two years afterwards, and subsequently sold, in consequence of his owner not requiring his services any longer.

The third case was a stout chaise-horse. The same operation proved entirely successful. The horse has been actively worked since. The calculus proved rather larger than in the other cases.

LITHOTRITY PERFORMED BY MR. ADAM POPE, TARVIS, ABERDEENSHIRE. This gentleman wrote to Mr. Dick, requesting his advice concerning a mare, who every ten minutes was discharging her urine, and so suddenly that she had not time to camp herself; the consequence of which was, the running of the urine down her thighs and legs, excoriating them. Her urine was tinged with blood. Mr. Dick conceived the case might be one of stone, and recommended manual examination, and the extraction of it by dilatation.

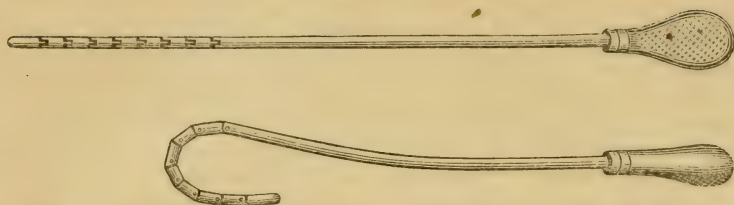
Mr. Dick's opinion proved correct; and Mr. Pope proceeded to the operation "by introducing the left hand into the rectum, and with it pressing the stone towards the opening of the urethra."—"I had thus a full view of the orifice; but finding, from the size of the calculus, that it would require an uncommonly large wound to allow of the extraction of the stone in one piece, I merely dilated the urethra by making an incision

about an inch and a half in length; and then, introducing a pair of forceps, I took hold of the stone, and broke it down. This was the more easily effected from the circumstance of the stone being of a conglomerated texture. I then gradually removed the substance, piecemeal, which when collected together, weighed upwards of eight ounces." The calculus was analysed by Dr. Murray, and found to be composed of forty parts of carbonate of lime, sixty of animal matter, apparently mucus of the bladder and albumen indurated. A twelvemonth afterwards Mr. Pope found the mare "about as ill as ever." "There was new stone formed; but the urine was mixed with sand." Mr. Pope tried muriatic acid, but gave it up from the difficulty of administering it. At length she was destroyed. *Autopsy*: The left kidney greatly enlarged; the right less than usual, and containing, in its pelvis, a stone weighing one ounce and a half, and in its tubuli several small calculi. "Most of the tubuli uriniferi were enlarged into cysts, containing, in both kidneys, a mixture of sand, urine, and pus." The parenchymatous substance was rotten, crumbling down between the fingers. Mr. Pope concludes with the conviction that the mare must soon have died from emaciation; that her whole complaint was in the kidneys; that it was incurable; and that applications to the bladder were futile.—'THE VETERINARIAN' for 1833.

The following case comes from Mr. C. Taylor, V.S. Nottingham. It is one doubly interesting, from the circumstance of its introducing a new instrument to our notice:

Mr. Taylor was called to attend a chestnut hunter, belonging to Mr. Wright, a surgeon, whom Mr. Taylor afterwards assisted in his operation. "The horse passed bloody urine, with frequent attempts to evacuate the bladder, and which took place almost invariably after exercise, and more so after quick exertion." On examination, Mr. Taylor discovered "a solid body about the size of a pullet's egg within the bladder, near its neck, and which was moveable." Prior to operating, Mr. Taylor was desirous to try if he could not invent some sort of sound which would pass at once into the bladder; and in this he succeeded. "It was of polished round Iron, three feet long, one inch and a half in circumference, with eight joints at its further extremity," or rather half-joints, so that the moveable part could only act in a straight line and curve in one direction, and be perfectly smooth either when straight or bent¹. Here the instrument is represented both in its straight and curved state.

¹ For a minute description of the instrument see 'The Veterinarian' for 1834.



The following is Mr. Taylor's account of the operation in his own words:—"April 1, 1833, 9 o'clock A.M.—The horse (having been previously prepared by physic and bran diet) was cast, and secured on his back as for castration, and bolstered in that situation with two sacks of corn firmly tied up. Having the penis drawn from the sheath by an assistant (the rectum having been previously emptied), I endeavoured to inject the bladder with warm water, but was only able to distend the urethra, from the resisting contraction of the sphincter. I then passed my jointed sound into the bladder, and, having given it to an assistant to hold, pushed my hand into the rectum, and brought the body in the bladder into contact with it, and the assistant was satisfied it was a stone that struck the end of the sound. Continuing this instrument in the bladder, held by the assistant, I placed the fingers of my left hand upon the perinæum, opposite the symphysis pubis, and, drawing the integuments up, kept the parts tense. I then commenced the external incision immediately below the arch of the pubes, close on the left of the raphe, and continued it down obliquely by the side of the anus, making the external wound three inches and a half in length. I then divided the *fascia* and *transversalis perinæi* muscle, and introduced the fore-finger of my left hand into the wound, and distinctly felt the pubic artery where it enters the bulb. I kept my finger upon it, and carried on my deeper incision below it, laterally, down by the side of the rectum, through the connecting cellular texture, occasionally feeling for the sound of the urethra, which I cut down upon in its membranous part, beyond the bulb, though with some little difficulty, which I apprehend was in consequence of the jointed part being moveable. A straight fluted staff was then introduced into the bladder, through the opening in the urethra, and the calculus again distinctly felt and heard on being struck. The sound was withdrawn the forceps introduced, and the stone attempted to be extracted, supposing from its size, compared with the dilatability of the neck of the bladder, that it might be extracted without division of the neck; but that not being practicable on account of the sphincter forcibly contracting, the fore-finger of the left hand was introduced into the bladder, which served as a director to a long probe-pointed bistoury, which was then passed within the neck of the bladder, and its division completed by withdrawing the bistoury, keeping the edge downwards and outwards in a line with the external wound. The empty calculus

was then easily extracted. It was of the size of a small pullet's egg, rough on its surface, with a pungent urinary smell, sandy texture being easily broken, and of a light nature, weighing not quite three ounces. The hemorrhage was trifling, and I did not find it requisite to take up a single branch of the small arteries necessarily divided. The bladder was washed out with warm water, by using a patent syringe, and two sutures were applied by the side of the anus, connecting it with the common integuments." No unfavorable symptom appeared. The horse rose well, and had a draught of tinct. opii. ʒss in aquæ Oj. At three o'clock P.M., the pulse being 48, and full and hard, he was bled to four quarts. He passed his urine principally by the urethra. He was tied up with two halters, and a man sat up with him. *April 2d.*—Discharges his urine (which is tinged with blood) partly by the wound and partly by the urethra; appetite good; bowels regular; no medicine necessary. Let loose in a box at day; tied up at night as before; and a man sat up. *3d.*—Suppuration in the wound. Urine evacuated from the wound principally, and in a gush, and still bloody.—*4th.* Healthy suppuration. Urine principally from the wound, but no longer bloody.—*5th.* Lay down at night.—*6th.* Had an inflammatory swelling on the left of the sacrum and above the ischium, which was fomented.—*7th.* The swelling subsiding. Urine passes partly through the wound.—*8th.* Swelling nearly gone, and a similar one coming on the right of the sacrum, which was fomented.—*9th.* Swellings disappearing.—*10th.* Wound granulating. Urine passing principally by the urethra.—*11th.* But little suppuration. Granulation luxuriant.—*12th.* Wound contracting.—*14th.* Passed two quarts of urine by the urethra; none by the wound.—*15th.* Observed loss of flesh about the quarters and loins; though all continues going on well. Clear urine passes by the urethra; none by the wound, which is nearly healed.—*22d.* Wound perfectly healed, and his urine discharged the same as in health, both as to times and quantities.—*23d to 27th.* Daily walking exercise in hand.—*28th.* Was ridden a short distance.—*29th.* Discharged, quite well.—Mr. Taylor concludes a case, so highly creditable to his professional character, in these words:—"I consider that the successful result of the operation is mainly attributable to the opening in the urethra being made in its membranous part, and which could not well have been carried into effect without the jointed sound, which acted as a principal guide in the operation, and also the urethra not being laid open to any extent."—'VETERINARIAN' for 1834.

The next case on record happened to Mr. Robinson, V.S., Tamworth, who sent an account of it to 'THE VETERINARIAN,' for 1837, from which our extract is taken. Along with other

interest it possesses, it appears to confirm the utility of Mr. Taylor's jointed sound.

A favourite black horse (Jack), the property of H. C. Hindle, Esq., Mayfield, Walsall, was in April 1836 brought to Mr. Robinson for his opinion. His symptoms, which had been noticed for four months, were described to be "frequent and painful attempts to void his urine." Mr. Robinson begged the horse might be sent to his infirmary. The bladder was examined per rectum, and "a large solid body found firmly fixed towards its neck." Mr. Hindle was told that lithotomy was necessary; to the performance of which, "after a few months he gave consent."

A whalebone probe was first passed, "but from the struggles of the animal it was withdrawn, and the jointed sound introduced. The opening into the urethra was then enlarged, and the external incision carried obliquely down by the anus for about four inches. The fore finger of the left hand was used as a director in opening the pelvic portion of the urethra and neck of the bladder. The forceps being found to be too weak, and inadequate for the extraction of the calculus, a further division of the bladder was made, to admit the hand of Mr. Friend (considerably smaller than my own): but so firmly did the coats of the bladder adhere to the rough mulberry surface of the calculus, that it was with very great difficulty the fingers could be insinuated between them; and then so tenacious was the grasp with which it was held by the contractile power of the bladder, that it required considerable force to remove it." Only a few ounces of blood were lost: no ligatures necessary. The calculus was of the mulberry kind, weighed 1lb. troy, and measured nine inches by eight in circumference. It has been presented by Mr. Robinson to the Veterinary College Museum. A good deal of sloughing followed, so extensive being the wound; but all went on well, and on the 18th day afterwards the urine passed, exclusively, through the natural passage. Unfortunately, however, in the tenth week after the operation, from some sudden and violent exertion, "he produced some disarrangement of parts in or near the neck of the bladder, from which he has never perfectly recovered. There began from that time, and has still continued to exist, a slight draining of urine occasionally by the urethra. There appears a partial power, however, to restrain this, as frequently there will be no discharge while he is being ridden or driven several miles, though it will commence again as soon as he stands still." Mr. Robinson suspects some fresh rupture of the wound in the neck of the bladder, which, though healed again, has left some loss of power in the sphincter; or there may exist, he thinks, some scirrhus opening through the neck, which it cannot always close.

MR. WILLIAM FIELD'S METHOD OF OPERATING will be

best learnt from taking the narration of a case he sent to 'THE VETERINARIAN,' in 1847. It runs thus:—

A grey gelding, aged, the property of C. Smith, Esq., of Balham, Surrey, was sent into Mr. Field's hospital for horses on the 28th of July last. The symptoms being unequivocally those of *stone in the bladder*. Mr. Field determined at once to perform the operation. Accordingly, after some two or three days' of preparation, the horse was cast and secured in the manner usual for lithotomy, and went through the operation without anything extraordinary occurring: the casting and liberating and operation, altogether, not occupying more than twenty minutes. This being the sixth case on which Mr. Field has operated, five out of which have proved successful, and his mode of operating being as simple as it is effectual and safe, it may be desirable here that we should briefly run through its details. For the male subject he needs no more instruments than *staff*, *scalpel*, and *forceps*; which ought to be long enough in the blades to admit of being opened wide while in the bladder, for the female, forceps only: nor does the latter require to be cast for the operation; it being most conveniently performable on her in the standing posture. The male subject being cast, and turned upon his back, with his hind legs drawn forward, the staff—which is a polished iron one, of unusually large size, with a curve at the end, having a groove along it—is passed through the penis along the urethra, and pushed on until it abuts against the symphysis pubis, or rather until its curved part has entered the curvature of the urethra, which it will readily be found to do. Thus introduced, the staff is to be committed to the operator's assistant, and by him held in the upright position, at the same time that its end is kept steadily maintained within the curvature of the urethra: this will enable the operator readily to make an incision with his scalpel through the perinæum into the groove of the staff, of ample dimension to admit his forceps; which are now, after the finger has been introduced into the passage to make everything clear, to be insinuated, and with moderate but sufficient force to be pushed onwards into the bladder. No gorget or bistoury is used to dilate or to incise the urethra; but a pair of straight forceps, having narrow spoon-shaped blades, are at once cautiously introduced, the urethra, through its extreme elasticity or dilatability, giving way to them.¹ The stone extracted in the present case was of the mulberry description, of a round oblong shape, and weighed four ounces and a half. It was dark-coloured, and possessed a strong urinous odour. The extraction of the stone was followed up by injections of tepid water into the bladder. Immediately

Does not the urethra suffer laceration or tearing open.

after the operation the animal staled freely, his urine passing through the wound, which had been brought together by sutures, as well as through the penis; and for the three subsequent days, urine still issued, in part, through the wound. On the fifth day, however, it came altogether by the natural passage. The horse did not experience a single untoward symptom; neither did he, after the operation was ended, seem to labour under any pain; for he ate and drank well during the whole of the time. He left Mr. Field's yard on the 4th of September, and is now at work, quite recovered.

Mr. John Field, in his 'Posthumous Records,' has bequeathed us five cases of lithotomy—four in geldings, and one in a mare; out of which one, a gelding, proved fatal. His mode of operating was much the same as that above described.

DILATATION was successfully practised in the mare. By examination *per rectum*, "a large tumour could be felt beneath the vagina. The efforts of the mare in straining enabled me, by introducing my hand into the vagina, and two fingers into the urethra, to feel the calculus, and ascertain it to be of the rough mulberry kind. Having two pairs of forceps, and also my instrument for breaking down calculi in females, I tried, but could only succeed with the oval forceps. With them I grasped the stone by its long axis, and found much difficulty in releasing them, owing to the extent necessary to expand the instrument. I next injected the bladder with warm water; but from its irritable condition, only a little was retained. This, however, assisted in causing a dilatation in the urethra, so that after more efforts, having grasped the stone by its short axis, we at last succeeded in removing it. It weighed 3xj 3vj; length 3 $\frac{3}{8}$ inches; breadth 2 $\frac{7}{8}$.

Professor Spooner is reported by Mr. Morton to have operated in two cases with success. On one, a gelding, lithotomy was practised. An incision was made by the Professor into the pelvic portion of the urethra, sufficient to admit the index finger; which was used as a director with a probe-pointed bistoury, to lay open the canal for two or three inches in a line with the rectum. Lithotomy forceps were introduced, but the stone proved too large for extraction unbroken. The crusher, used in human surgery, was

then tried, but its arms could not be extended sufficiently to clutch the stone. The forceps were therefore again had recourse to, and portions broken away with them of the edges of the stone, until it was sufficiently reduced in magnitude to admit of being withdrawn. The second case was one of calculus in the urethra.

Professor Simonds has likewise operated for stone. A mare was ascertained to have a calculus in her bladder, and he was requested to operate. The meatus, it was determined, should be dilated, and the stone crushed. After trials with the speculum vaginæ, nothing was found so effectual as an *hydrostatic* dilator, an instrument invented by Mr. Morton. Then, by the crushing instrument, with considerable force, the stone was broken in pieces and extracted with the forceps, and with the hand too, without difficulty. The stone, analysed, was found to consist of the usual constituents—carbonate of lime and animal matter.

URETHRAL CALCULUS.

By which is meant calculus lodged within some part of the canal of the urethra. Several instances of this are on our annals. A great many years ago, a case occurred to my father, in which a stone was removed out of the anterior portion of the urethra, near the end of the penis. This proved to be but a part of a stone, the remainder of which had stuck in the neck of the bladder, whence it had, after manipulation, moved, spontaneously, to the curvature of the canal, under the pubes. The horse ultimately died from ulcerated bladder and extravasation of urine.

Mr. Field was, in March, 1839, sent for to Streatham, to see a horse who had been in pain for a week, straining without being able to pass a drop of urine for two days. The horse was feverish; pulse 48, and thready. The bladder, through the rectum, was found enormously distended with urine. The cause soon appeared evident. Within a short distance of its end, the urethra was found plugged by a calculus, the size of a walnut, which could be felt with the nail of the

finger, from the orifice. A longitudinal incision along the under surface of the penis, opening the urethra for an inch, set the stone at liberty. It was of the mulberry form, with spiculæ projecting, and its posterior part was partly filled with sabulous matter.

Professor Spooner's second case was one of calculus in the urethra. The horse belonged to Sir Robert Peel. Some difficulty was experienced in passing the hand up the rectum, owing to the pressure against it of the over-distended bladder. At length, a calculus was detected, two inches up the urethra, from the orifice of the penis. Mr. Spooner was unable to move the stone far, and there would have been no particular objection to *cutting* it out; but he preferred breaking it, which he was enabled to do with obtusely-pointed forceps, although he had tried with them in vain, to extract it entire. The stone was of the magnitude of a walnut, and consisted of carbonate of lime with animal matter: the usual constituents.

In France, lithotomy has on several occasions, by different practitioners, been performed with success. Girard recommends the operation upon the horse standing. And instead of introducing any sound or bougie through the penis, has the urethra and bladder filled by injection with warm water. The instruments he uses are, a long-bladed bistoury, a straight fluted sound, and a pair of forceps curved at the ends. He commences with an incision in the perinæum, two inches in length, upon the side of the distended urethra. Next, he pushes the point of the bistoury into the urethra, which he dilates sufficiently to admit the sound to be now introduced, and to be passed onward into the bladder. Sliding the back of the bistoury along the groove in the sound, he divides the urethra, and also, in part, the neck of the bladder, which latter he completes the section of as he withdraws the bistoury. Lastly, he introduces the forceps, and seizes the stone across its short axis, in which he assists himself by having at the time his other hand insinuated in recto. He lays much importance on the necessity of making the incision through the urethra and bladder *ob-*

liquely to one side, which is ensured by keeping the cutting edge of the bistoury turned outwards, towards the angle of the thigh: a mode of procedure that facilitates the dilatation of the parts, while it guards the operator from wounding the rectum, and opening either the artery of the bulb or that of the urethra, and also from dividing the suspensory ligaments of the penis.

Modern surgical instruments suggest to us the possibility of extracting a calculus from the bladder of the male animal by the same means as are practised in the case of the female. When the urethra of the male comes to be opened in the perinæum, and the passage into the bladder is thereby reduced from a sharp curve to nearly a straight line, it appears to me to afford all—or nearly all—the facility for an experiment of this kind which the female urethra presents; and that we have only to furnish ourselves with proper instruments for dilating the passage, and breaking the stone, should that be required, to, in some cases at least, succeed without the necessity of slitting up the urethra and bladder: at all events, when the calculus is small or of a friable sort, such simple means, I think, ought to be tried before the formidable operation of lithotomy be determined on.¹

CYSTITIS—CYSTORRHŒA.²

The first of these terms appears to be most generally used to denote inflammation of the entire substance of the bladder; the latter, any inflammation attended with flux of its lining membrane, or even the flux alone: to this last affection has likewise been given the appellation of *vesical catarrh*.

I know of no instance of cystitis in the horse; though it is a disease which might occur, indeed would be very likely

¹ This paragraph was written in the year 1841; the practice of the present day pretty well verifies the suggestions contained in it.

² A case of "Cystocele" is reported in the Index of the 'Veterinarian,' vol. xiv, p. 48, but cannot be found.

to follow any injury of a mechanical or chemical nature. And should acute inflammation attack the bladder, the symptoms would certainly be of a very painful and distressing kind; such as would call for prompt and potent antiphlogistic measures, and at the same time require a deal of soothing treatment to allay the extreme irritation which would be sure to be present.

Mr. Siddall (V.S., Royal Horse Guards) has at this time (Nov. 4th, 1852), a case very like cystitis. The (B Troop) horse, eight years old, has frequent micturition, voiding small quantities of urine, never amounting hardly to half a pint, with, when not staling, occasional dropping of urine from the sheath. During micturition, he expresses pain and annoyance, though at other times he appears in full health, his condition and his appetite being good, and his coat fine and shining. He suffers large quantities of dung to accumulate within the colon and rectum, rather than try to void it, from the act, it is imagined, giving him pain. His urine is always turbid, and mostly loaded with matters swimming about in it, which become deposited on standing, and turn out, on examination, to be, for the major part, the mucous secretions of the bladder, though at times sabulous matters are detected, of which Mr. Siddall has collected about half an ounce. He thinks, when his hand is up the rectum, he can feel some tumefaction about the neck of the bladder, as though there was enlargement of the prostate. The case seems to be that of (subacute) cystitis. The urine, chemically tested, proved highly *alkaline*, so much so, that it actually effervesced from the addition of (either acetic or muriatic) acid. I advised the administration of acids. Passing the straight (gutta percha) catheter daily (which was readily done by the farrier-major), gave issue to the urine, and this afforded relief (though every now and then its continuous stream was arrested or interrupted by matters clogging the tube). So quiet and willing was the horse for this operation to be performed, that he not only required no twitch, but even did not need a bridle, or being held by the head.

Two notable cases of cystorrhœa used to be related by the late Professor Coleman in his lectures.

The Professor received a message to attend two mares, dangerously ill, belonging to General Brownrig. Finding, on his arrival, one of them dead, he had her body opened at once, with a view of throwing a light on the nature of the disease under which the other continued to suffer the extremest agony: the symptoms in both cases being analogous. The mucous coat of the bladder was discovered in a high state of inflammation, in places mortified and eroded in consequence, apparently, of some caustic substance; a suspicion which was afterwards confirmed by the admission of the coachman that he had introduced some such substance—by mistake—into the bladder, with the intention of exciting the mares to become horsing. By active depletion and copious injections of tepid water into the bladder the survivor was recovered.

ISCHURY—DYSURY—STRANGURY.

The first of these terms denotes a total suppression of urine; the two others, but a partial arrest; *dysury* implying a difficulty in staling; *strangury*, a painful and frequent staling by drops only. In common parley we often make use of the *suppression* and *retention* of urine synonymously; though the former, properly speaking, signifies that no urine is secreted—that there is none in the bladder; the latter, that the bladder is full without the power of evacuation.

Various causes may give rise to a suppression or retention of urine. The kidneys may be in that state in which they no longer retain the power of secretion: inflammation may put a stop to their function as it does to the functions of other glands. Spasm at the neck of the bladder—which, I believe, occasionally attends colic—may cause ischury or dysury. A calculus may give rise to dysury or strangury. Paralysis of the bladder may likewise prove the occasion of it.

To draw off a horse's urine, but a few years ago we were told we had no alternative in the male but to cut into

the urethra through the perinæum. We now know that a flexible gum catheter, or one made of gutta percha, in the hands of a skilful veterinarian, is, in the normal state of the passages, capable of being passed through the entire urinary canal; and we may add, there seems reason to hope that Mr. Taylor's jointed sound may lead to the invention of some sort of flexible or jointed metallic catheter.¹ This is the more to be desired from the acknowledged inefficiency of the gum or gutta percha instrument in cases wherein much resistance or obstruction is to be overcome. Fortunately for himself and us, the horse, however, is not subject either to stricture of the urethra or to diseased prostate glands.

The OPERATION OF CUTTING INTO THE PERINÆUM must, however, still be had recourse to in cases in which no catheter can be introduced. It consists in passing a full-sized whale-bone staff, flattened and grooved at the end, through the penis, until its extremity be felt by the other hand protruding in the perinæum upon it, steadily held by an assistant in this situation, making an incision down to its groove, laying open the urethra to a sufficient extent to admit the introduction of the *straight* or female metallic catheter into the bladder, the same as is done for the admission of the gorget or bistoury in stone. This is an operation very easy of performance, and one that must at all times supersede the necessity for puncturing or

TAPPING THE BLADDER, as it is commonly called. Still, there may possibly happen cases in which even the straight catheter, *per perinæum*, cannot be made to enter the bladder; and as the organ in a state of distension must be, some how or other, relieved, or it will burst, it is right we should inform ourselves of the alternative mode of operating, viz., tapping the bladder. One method of doing this consists in carrying a curved trocar in one hand into the rectum, and plunging it through the gut into the prominence of the bladder felt below: the other, or *low* operation

¹ Could a catheter made of some material such as the flexible metallic bougie at present in use in human surgery be made to pass?

—corresponding to the *high* one in human surgery—is stabbing the bladder with a straight trocar of sufficient length immediately above and in front of the pubes, through the recti muscles. Taking into consideration the horizontal posture of the animal, the comparative facility with which it is practised, and the fact that punctured abdominal wounds are not of that dangerous character they bear in man, there appears to me reason to prefer the low to the intestinal operation: at the same time I feel it my duty to state, that this opinion has no other foundation than a theoretical one, grounded upon anatomical knowledge, having always myself, in practice, cut into the perinæum rather than have recourse to the trocar at all. No one, I should imagine, would like to risk casting a horse with a bladder distended to bursting; in the erect position, supposing the rectum to be the medium of puncture, the fluid would have to *ascend* to escape; whereas, through the pubes, the urine would certainly flow away most readily. Mr. Cartwright, who has penned some very sensible practical observations on this subject in ‘THE VETERINARIAN’ for 1831, apprehends that some intestine might be wounded, and seems persuaded that the peritoneum must be, in the pubal operation. Perhaps, under *ordinary circumstances*, the membrane would be likely to be so; but while the bladder continued in that altered condition and situation which a surcharge of urine gives it, I should not fear either of these consequences.

INVERSION OF THE BLADDER.

M. CANU (PÈRE), in 1815, met with inversion of the viscus, in a mare, in parturition. The mare had, after a severe and painful labour, brought forth a dead foal, which had survived but half an hour; and now exhibited a large membranous mass hanging out of her vulva. In the course of the efforts she was constantly making, the ureters launched forth a stream of urine to a considerable distance, which convinced me that the bladder was in the ejected mass. Being unable to afford relief through reduction, and inflam-

mation, threatening mortification, coming on, a ligature was passed round the mass, including the portion of bladder behind the ureters, with directions for it to be tightened from time to time. This caused the reduction in volume of the parts until nothing but a particle remained behind the ligature: this was subsequently cut through without hemorrhage. The parts anteriorly, immediately retracted, and the vulva completely closed upon them. The annoyance now was the continual streaming of urine down the thighs, which was at length directed outward by the contrivance of a gutter of tin, fixed within the vagina. In six weeks the mare resumed her work.—‘VETERINARIAN,’ vol. xiv, p. 501.

Mr. Leech, V.S., Asbourne, met with a similar case in 1847, which proved fatal. He was requested to attend an aged cart-mare, who had foaled but a few days before, in consequence of her having “put her reed down.” On examining her, he found that instead of the protruded mass being the uterus or “reed,” it was the bladder which had become inverted. It was much inflamed and tumefied; but notwithstanding, a little distance from its neck, could be seen the termini of the ureters, from which orifices the urine was every now and then ejected, trickling down the legs and excoriating them. I passed a strong ligature around the neck of the bladder, taking care to be behind the ureters, and then directed to bleed and physic, &c. The ligature was tightened every day. On the sixth day afterwards, I cut off the mass behind. It weighed seven ounces. Symptoms, however, inclined me to the belief that mortification had set in, and three days from this operation she died. “The neck of the bladder and the part that had been *anterior* to the ligature was four or five times thicker than in health, and was in a state of *sphacelus*.”

SECTION XV.

DISEASES OF THE ORGANS OF GENERATION.

IN THE MALE.¹

DISEASE OF THE SCROTUM.
 DISEASE SIMILATING SYPHILIS.
 URETHRITIS.
 GONORRHŒA.
 PHYMOSIS.
 PARAPHYMOSIS.
 AMPUTATION OF THE PENIS.

IN THE FEMALE.

LEUCORRHŒA.
 VAGINITIS.
 TUMOURS ON THE VULVA.
 HYSTERITIS.
 HYSTERIA.
 HYDROMETRA.
 DISEASES OF THE OVARIES.
 PROLAPSUS UTERI.²

APPENDIX TO THE FIFTEENTH SECTION.

THE OPERATION OF CASTRATION.—THE DISEASES INCIDENT TO IT.

PRELIMINARY OBSERVATIONS.

FERTILE and important as the subject on which I am now about to enter is to the human pathologist, it is one which presents but little interest for the veterinarian. In the absence of causes of a syphilitic nature, the horse, in comparison with man, appears but little obnoxious to disease of his generative organs; so little, indeed, that British writers are all but silent on the subject: a proof that their practice—to which I may add my own—has afforded very few such cases for treatment. The custom of castration in our own country, in depriving the animal of two important glandular organs, has liberated him from passions and sympathies of the most influential nature, and constitutes, in the male,

¹ The custom of castration in this country has rendered all notice of the *diseases of the testicles* unnecessary; at least, such could only prove of service to veterinarians practising in parts of the country where racing establishments exist, from the practical observations of whom, indeed, they must be furnished.

² For Prolapsus Uteri, vide 'VETERINARIAN,' vol. ix, p. 332.

another reason for the rarity of disorder of the sexual parts ; at the same time that it accounts in some measure for the difference between our own circumscribed list of the diseases of these parts and the comparatively extended one presented to us by veterinarians of those countries in which castration is not generally practised.

D'Arboval, with disgust and indignation, repudiates the idea of animals being the subjects of syphilis. He justly observes, that we now well know that *lues venerea* is a disease peculiar to man ; that it can have but one and that a specific origin ; and that, for animals to contract the disorder we must suppose an intercourse between them and human beings at once of the most unnatural and revolting character : adding, however, that such monstrous acts have been known to take place, although, as far as the animal—especially the horse—is concerned, connection with any other than its own species and like, is, throughout nature, observed to be most abhorrent. Notwithstanding this admitted fact, and notwithstanding the assertion raised upon it by some one or more continental veterinarians, that the horse has been seen affected by syphilis, D'Arboval still maintains his disbelief in any such doctrines, and is only surprised that the College at Alfort should have countenanced them. His words are—“ I have not passed through a long course of practice without meeting with cases which biassed minds might have taken for syphilis. I have had occasion particularly to observe and to treat irritations, inflammations, paraphymoses, discharges, ulcerations, &c. I have even remarked an obstinacy in some of these genital affections, with sympathetic swelling of the inguinal glands, and of one or both testicles, without, for all that, entertaining any notion of the disease being syphilitic. So far from it, I have always been contented with simple antiphlogistic treatment, modified as circumstances required ; and I have never had cause to repent of not having introduced mercurials.”

DISEASE OF THE SCROTUM.

In October 1849, Colonel Biddulph's little black charger, a colt he bought out of a lot of the dealer's, now four years old, was brought to me with considerable swelling over *one* side only of the scrotum. Examination showed that there was a tumour about the magnitude of a small orange, contained in this side of the bag, which appeared loose and floating, as though isolated, and did not seem to have any connexion with the chord. There was not much tenderness in it, and it was solid and firm to the feel. It had not been discovered before it reached its present size, and would not perhaps even now had it not given rise to some infiltration of the pendulous part of the sheath below. In the course of a week the swelling appeared augmented, and when felt no longer conveyed the sense of isolation, but seemed to involve the entire substance, skin and all, of one half, of the scrotum. In a few days it in one spot came to a head, the abscess upon it being as large as a marble. This I opened, letting out a spoonful of such aqueous pus. Physic and fomentation have been prescribed, and latterly has been given the alterative ball (Bol. Plumeri), night and morning. Since the suppuration, the swelling has been gradually diminishing, and he has been dismissed for work. It is possible, though castration must have been performed long before—say, certainly, two, perhaps three or four years, antecedent to the period of what appeared to be scrotal disease—that this attack may have owed its origin to disease of the end of the chord, though there existed no proofs of it.

THE DISEASE MISTAKEN FOR SYPHILIS.

This affection according to D'Arboval's observation, "ordinarily commences by an inflammatory irritation of the glans penis, which extends to the enveloping membrane, runs along the dorsum penis, and thence sometimes spreads upon the lining of the sheath. So long as no morbid exudation is

present, the parts continue tense and shining, and painful from inflammation; but as soon as any issue appears, the usual lubrefactive secretion becomes augmented and thickened, and acquires a strong, penetrating, fetid odour: sometimes the secretion is mingled with a whitish serosity, and the cuticle of the penis peels off in flakes. The irritation may give rise to phymosis or to paraphymosis. When partial, or exhibiting intensity only in certain points or places, little circumscribed patches of redness become apparent, succeeded by small vesicles, which break and leave little ulcers, considered improperly to be chancres. But the irritation does not confine itself to the part first attacked; it spreads to the membrane lining the urethra, connected, sympathetically, with the integument, and produces those morbid discharges known as *runnings* from the penis. And should the animal have connection with the female while this running continues, the same sort of irritation may manifest itself in the vagina.

“CAUSES for this irritation may be found in the habitually uncleansed condition of the genitals of animals; in the divers accidents to which they are exposed; in the introduction of foreign substances into the sheath; in collections of concremented sebaceous matters underneath the prepuce; in any abuses in coitation; in acrid injections into the urethra, or in the presence of calculus or any other strange body within the canal.

“THE TREATMENT most suitable for these cases consists in applying tonic emollients so long as any serous exudation is present; refrigerants, when not aided by nitred mucilaginous drinks and injections, and strict attention to diet and regimen. When the cuticle separates, to allay the irritability of the denuded parts, we use narcotics either in decoction or aqueous solution. We are rarely compelled to have recourse to any phagedenic lotions, still more rarely to catheterism, or caustics.”

URETHRITIS—GONORRHŒA.

The same irritation which now and then becomes manifest upon the exterior, may attack or extend to the interior of the penis; or it may be engendered exclusively within the urethra by causes existing within the canal itself. Owing to almost all our horses being geldings, this affection, like the foregoing is extremely rare in its occurrence—so rare, indeed, in our own country, that, for any systematic account of it, we are forced to borrow from the continent. When accompanied by any discharge, the disease will assume the form of *gonorrhœa*: in fact, when running constitutes the only complaint—all inflammation having left—the urethritis becomes, in the nosology of Cullen, a veritable *gonorrhœa pura vel benigna*. I have seen a well-marked case of this in a dog, but never one in a horse.

The CAUSES, according to D'Arboval, are divisible into such as are *direct* and *local*, *indirect* and *internal*. "The former comprise foreign substances within the canal, and too frequent acts of copulation, especially with a female having vaginitis, or in whom the vagina is small compared to the size of the organ of the male. Among the second class of causes come different irritations of the alimentary canal, such as drenches or balls of cantharides given on occasions to reinvigorate the stone-horse; the presence of ascarides within the rectum; metastasis of irritation; inflammation in the bladder; retention of urine.

"SYMPTOMS.—It is difficult to detect the beginning of an affection of this kind, and almost impossible to say what amount of pungency or scalding the horse may experience, unless it be great enough to create pain; and then the animal, while in the act of staling, may be observed to cast looks back at his flank, stamp with his feet, and shake his tail about, and, having finished, to moan and express a good deal of uneasiness, as if he felt a veritable *ardor urinæ*. There is no examining the penis unless it be drawn; and to induce a horse to draw, a mare may be shown him; the orifice of the urethra may then be observed to be red and

tumid, and to issue a little mucous discharge. Some few days afterwards the desire to stale becomes more frequent, and the emissions of urine more painful; the running also increases and grows thicker, turns yellow or green, and is capable of being forced out by pressure from above downwards; the end of the penis and the prepuce become swollen; and all this is accompanied by frequent and painful erections. When the inflammation runs high, pressure upon the penis occasions a great deal of pain in the urethra, bloody streaks are perceptible in the discharge, and so great is the tumidity of the membrane of the urethra, that the urine can be emitted but in small jets or drops, and with considerable difficulty and pain. Erections become more frequent and painful; the penis grows curved; and engorgement of the testicles, spermatic cords, and scrotum or sheath, supervene. The testicles hang lower than usual, sometimes they swell, and grow hard and painful, in particular the epididymes; the spermatic cord partakes of all this, and occasionally presents the appearance of *champignon*. Besides this, ulcerations may be observable upon the body of the penis, particularly about its lower extremity; and buds, or kinds of nodosities with large bases, more or less developed and prominent, are found firmly adherent to the corpus cavernosum, raising the skin up from it. These ulcerations vary in extent; sometimes they possess callous elevated borders and livid bases. Lastly, the fossa navicularis at times sends forth red exuberant granulations, which we may take as an indication that the interior of the urethra is in a state of ulceration.

“This affection is complicated now and then with the disorder of some other mucous membrane, commonly of the bronchitic or enteritic character.

“The TREATMENT is necessarily antiphlogistic. Tepid, bland, nitred, mucilaginous fluids both offered as drink, in lieu of water, and given as drenches; green meat, or, when that cannot be obtained, some good straw; roots, such as carrots and turnips; vapour bath or fomentations; clysters; and the application of some sort of suspensory bandage to keep the testicles up, and so relieve the chords, constitute

the remedial means indicated in slight cases: but when the inflammation runs high, there will be necessity for frequent fomentations; for cataplasms, which may be retained by a suspensory bandage; for applying leeches upon the penis; and in some cases for one or two general bloodlettings. Should the pains experienced be very great, laudanum may be added to the drenches; the fomentations and poultices may likewise be rendered narcotic. When the testicles become affected, leeches may be oftener applied, and in greater numbers.

“Astringents and discutients will be required so soon as all pain has left, and the inflammation has abated. We must commence with the weakest. The fumes of vinegar, the vegeto-mineral water, the solution of diacetate of lead, or alum dissolved in strong vinegar, may be employed. Champignon, or other intractable ulcerations, must be touched with lunar caustic.”

PHYMOSIS.

PHYMOSIS—from *φίμωσις* a bridle—denotes that morbid condition of the prepuce or sheath which, from contraction of the orifice, prevents the drawing or exit of the penis. In man, phymosis may arise from natural causes; but in animals I believe it will be found to be always the effect of disease. Our best source of information on the subject is D'Arboval's Dictionary: from this we learn that—

“Phymosis is, ordinarily, the product either of inflammation and engorgement of the prepuce, round about its orifice, or of tumefaction of the glans penis, or of the co-existence of these morbid states. Blows, kicks, contusions, wounds, abscesses within the sheath, the presence of warts or excrescences of any kind, polypi even, may all be set down as occasional causes. In geldings, the penis becomes diminished in volume and length, so much so in some horses as not to be protruded in the act of staling, in which case the sebaceous secretion furnished by the interior of the pre-

puce accumulates within the folds of the integument, and acquires by detention irritating properties, which cause the glans penis to inflame and swell to that degree that the animal can no longer pass his urine. The consequence of this is, that the animal stales inwardly—*pisse dedans*, as the French phrase goes. And the presence of the urine in time gives rise to concretions within the cavity and around the glans, or else to abnormal growths, or to ulceration of the prepuce, or to such an inflammatory engorgement of the parts as will be likely to end in gangrene. Such an event puts a stop to copulation, and frequently ends in paraphimosis.

“The most common and favorable termination of all this is resolution, and such may reasonably be expected so long as the inflammation continues moderate, or shews a disposition to abate. To bring this about we ought to employ active antiphlogistic treatment with emollient and narcotic fomentations, poultices, &c., such, in fact, as are recommended for urethritis. In addition, we may abstract blood from the superficial abdominal veins, and, by way of general bloodletting, from the saphena veins. Leeches and scarifications may also be advantageously employed, followed up by vapour fomentations and poultices.

“The OPERATION FOR PHYMOSIS is rarely required. Unless there be concealed ulcerations, or concretions, or granulations, that call for it. And then the prepuce must be slit far enough back to allow of its retraction; by which all subjacent disease becomes exposed, and by being treated according as it may require, will be speedily cured.

“The following case shews that phymosis may prove the forerunner of serious mischief:

“A mule, two years old, had a considerable swelling of the sheath and surrounding parts, in which points of suppuration had made their appearance. The urine came away by drops. There was phymosis. M. Maupis learnt that two months before some warts had been excised, and that since, the skin had become indurated and thickened around the orifice of the prepuce. The mule being cast, the contracted preputial orifice was dilated, and openings and counter-openings were made in the

surrounding parts. For twelve days afterwards the animal continued amending, when one morning he was discovered agitated, stamping, trying every moment to stale, and trembling. But little urine passed; the glans penis was very much swollen; and the pulse very quick. We were about examining into the state of the bladder, when the mule threw himself down, then rose again, and in this convulsive effort discharged a quantity of highly offensive urine *per anum*. This relieved him; though still he continued to strain, and every now and then passed more urine, as before. Notwithstanding there must have existed here a urethro-rectal fistula, not many days elapsed before it healed; for the urine again took its natural course, and the animal perfectly recovered."

PARAPHYMOSIS

Is the opposite to phymosis. Instead of the penis being covered and confined within its sheath, it is protruded out, and remains uncovered, and cannot be drawn back within its sheath or prepuce again. This may arise either from the prepuce being in such an inflamed tumefied condition in its retracted state as to become tightly girthed round about the neck of the glans penis, forming a sort of bridling or strangulation of it: or, from the glans itself being swollen to that degree that the prepuce cannot be drawn forward to cover it.

D'Arboval informs us, that paraphymosis is seen sometimes in horses, but oftener in dogs; and that the stone-horse is more subject to it than the gelding.

"In the Horse, paraphymosis may be the result of accident, or of an operation, or of castration. In the stallion it may have its rise from excessive venereal action; from long and continued friction, before coitus, against the female; from strokes with a whip or stick upon the yard while in a state of erection; from kicks upon the part, which the male renders himself subject to in attempts to cover a vicious mare; from the introduction of the penis into the anus of the mare; from negligence or *mal-adresse* of the groom in directing the penis into the vagina; from vain attempts to cover a ringed mare (*jument bouclée*); from introduction of irritating substances into the prepuce with

a view of inducing staling ; from the penis becoming loaded with warts, or scirrhus or other excrescences. Chabert saw a stallion with an enormous paraphymosis, and having involuntary discharges of semen, occasioned by fretting and harassing himself during the night after other horses.

"The penis, paraphymosed, appears, with its glans, evolved out of its sheath to the extent of about half a foot, swollen to the size, perhaps, of a man's thigh, evidently the consequence of effusion into the cellular tissue of its envelopes, curved in the form of an arc, and knotted from partial circular contractions, which, when excessive, are productive of coldness of the organ. Its glandular extremity, the part most tumefied, turns of a red brown. Violent inflammation accompanies all this, and the pain consequent on it is extreme. For all there is so much swelling, however, in general the urine works a passage. Still, should the inflammation run very high, and spread over the body of the penis, gangrene is not unlikely to be the result."

TREATMENT.—In favorable cases, cold bathing in some river or lotions of iced water may be all that may be required to effect the reduction of the penis : caution, however, is necessary in the use of these means. In other cases, emollient remedies succeed best, and particularly in such as are the consequence of inflammatory engorgement, from continued erection, or from the irritation of covering. Should the protruded portion of the penis be very much inflamed and painful, vapour baths may be employed to it, and emollient poultices be applied, with the help of the suspensory bandage. These means prove of no avail, however, when the paraphymosis is extreme : local bloodlettings by leeches or scarifications must in this case be adopted : free evacuation of blood being the only thing to effect a reduction, either spontaneously or with assistance from the practitioner.

M. Dehan attended a colt, four months old, for paraphymosis, with extreme tumefaction. He made eight pretty extensive incisions into the swollen parts, which produced an abundant issue of blood. The following morning the swelling was considerably reduced, as well as the concomi-

tant fever, and there was return of appetite. Four additional scarifications were made. The morning after, the yard had begun to recede within its sheath, and in two days more the colt was well.

To M. Lécoq occurred the case of a stallion who had escaped during the night from a field wherein he was turned, and got into an enclosure where there were some mares. The next morning he was found with his penis greatly swollen, and with difficulty in passing his urine. The protruded yard was curved from before backward, and exceeded in volume a man's head; it also felt hot, and pressure upon it caused pain, though the horse bore its being handled. The testicles were not affected. The pulse was full, and quicker than natural. Lécoq was not called in until the third day after the accident had happened. The enormous amount of tumefaction forbidding all hope of resolution, M. Lécoq made five incisions upon the anterior surface of the penis, each about eight centimetres in length and three in depth. From these, blood, mingled with serous effusion, issued in tolerable abundance, and, through the aid of fomentation, continued for four hours, thus superseding all necessity for general bloodletting. The next day, the tumefaction, though diminished, still being considerable, four fresh incisions, of less length and depth, were made between the former ones. The day after, the penis was not half the size, and the pulse was normal. Suppuration soon commenced, after which the wounds rapidly healed and cicatrized.

“We might probably obtain the same result by the application of a great many leeches, cold lotions, and strict regimen: to which might be added, general bloodletting, should it be required. In regard to scarifications, they ought always to be made *lengthwise*, and along the superior and lateral parts of the penis, so as to run no risk of puncturing the urethra. Exercise, when the case permits it, will likewise prove useful. In scarifying the sheath let the incisions be sufficiently deep to penetrate it, and extensive enough to set the penis at liberty. We need not be afraid of making scarifications too lengthy, inasmuch as they become small enough on the parts recovering their natural volume.

“Should not these measures prove of avail in procuring or rendering spontaneous the return of the penis within its sheath, they will, at all events, diminish pain and inflammation, and facilitate the steps next to be taken for its reduction: in fact, proceeding to any operation without such preparatory means might make the case a great deal worse

than it was at first. The operation for paraphymosis consists in passing a curved sharp-pointed bistoury underneath the stricture, and dividing it, and doing this in as many places and to as great an extent as is required for the complete liberation of the yard. Any hemorrhage that may follow will prove beneficial in facilitating the reduction, and should therefore be encouraged by fomentation ; afterwards poultices will be required."

AMPUTATION OF THE PENIS.

This operation, formidable to the animal if not to the operator, has been performed several times in this country as well as in France, it being one which extreme cases appear to render expedient, sometimes necessary. A state of disease, either of the penis or of its preputial covering, such as has resisted, and seems likely to resist, all ordinary treatment, or, indeed, such as would probably occupy any unreasonable length of time to cure, might warrant a recourse to amputation. Warts or excrescences, or enlargements of any description, intractable either from their magnitude or number, or from leaving behind them, after being removed, a disposition to reproduction ; extensive ulcerations of a phagedenic, foul, malignant character ; paralysis or relaxation ; or, in fact, any condition of parts opposing the withdrawal of a protruded penis within its sheath, may reasonably call for the performance of such an operation. Different methods, regulated by circumstances, have been pursued in the performance of the operation, which, as well as the diseases for which it has been found requisite, will probably be best shown by the recital of the cases themselves.

Huzard (senior) appears to have been one of the first veterinarians to practise this operation. His case was that of a gelding, whose penis was covered with chancres and warts. Calculating that he should have dangerous hemorrhage, and foreseeing the difficulty, nay, impossibility, of recovering the remainder of the penis once retracted within the sheath,

Huzard determined on removing the diseased portion by ligature. To accomplish this object, he provided a hollow sound or catheter, of sufficient length to reach beyond the place proposed to be severed, and still to project sufficiently out of the penis to admit of being confined by some sort of circingle to the body. The end to be introduced terminated in a little bulb; the other end had a couple of rings affixed to it, for the greater facility of confining it. The animal being secured in an erect posture, the instrument is introduced into the urethra, and pushed on until its bulbous extremity is felt beyond the part proposed to be sloughed off. A ligature is then passed around the penis, immediately anterior to the bulb, and, when being properly adjusted, is made as tight as it can be drawn, with the view of strangulating all that portion of the organ which is left projecting in front of it. The other end of the instrument is afterwards, by means of its rings, confined sufficiently close against the belly to prevent any dependence of the parts, in which state of suspension the urine can readily flow through it. At the expiration of twenty-four or from that to forty-eight hours, mortification will have taken place of the superficial, and to a certain depth of the subjacent parts, and a fresh ligature will be required, the old one remaining undisturbed. This in the course of three or four days commonly reduces the constricted part to a mere pedicle, which may be safely severed with the knife. The sound may now be withdrawn, and the parts left to heal over. Should the orifice of the urethra afterwards become contracted, which will be manifested by the smallness of the stream of urine and its tardy manner of flowing, a gum (or gutta serena) catheter may be introduced, and confined within it for some time. Any constitutional irritation that may arise must be met by antiphlogistics.

M. Barthelemy, in the year 1826, presented a paper on amputation of the penis to the Royal Academy of Medicine, detailing an interesting case for which he practised some very instructive and ingenious operations. The case consisted in relaxation, or a sort of paralysis of the penis, a sequel of a severe gastro-enteritis. Instead of pursuing Huzard's plan, Barthelemy preferred, as more expeditious and less painful, amputation with the knife, thinking the hemorrhage would not prove dangerous—although he had to operate on an organ in a state of erection and nearly as large as his arm—from knowing that the arteries of the penis are not distended save during erection. He commenced by introducing a canula or hollow sound into the urethra, of sufficient length and size; and about an inch beyond the place chosen for excision, passed a flat ligature around the penis, so as to arrest hemorrhage, and prevent the retraction of what remained into the sheath. "An assistant now grasped the end of the penis, while I with a straight bistoury performed the amputation; which was no sooner accomplished than away went the remnant, in spite of the ligature, into the sheath. It was impossible to re-introduce the canula.

No hemorrhage appeared at the moment ; but there was some afterwards for a few days, every time semi-erection took place for the purpose of staling. Every thing went on pretty well until the thirtieth day, when some difficulty in staling occurred. On examination of the penis, it was found that this was owing to the process of cicatrization having drawn the skin over the urethral orifice, and that the urine had forced an artificial passage through a fistulous opening directed upward, whose outlet was through the middle of the cicatrix. There was no getting at the part to dilate this orifice and introduce the canula, and still the retention of the urine was increasing." Amidst these difficulties M. Barthelemy determined on a new operation. He made an incision into the urethra four inches above the ischial arch ; but, in proceeding, he met with so many unexpected difficulties that he was obliged to give the operation up. Undismayed by this failure, he practised a novel operation, he intended, upon some condemned horses first, and then commenced anew on his patient, by making a fresh incision between the old one and the ischial arch. Here the urethra was easily found, and, a catheter being introduced, the bladder was emptied of its urine. The catheter being withdrawn, a pewter sound was introduced, and directed to the extremity of the penis, and the cicatrix there crucially divided, sufficiently to admit of a ready pssage. An œsophagus-tube was substituted in place of the sound, and confined within the canal by means of strips of waxed linen and strings, carried through the sides of the sheath, the same as setons, and the whole maintained for two months, at the end of which time, complete success crowned Barthelemy's enterprising operations. The author concludes his paper with these deductions :—1st, That amputation of the penis may be performed on the *gelding* without any apprehension from hemorrhage ; 2dly, that to avoid any obstruction of the urethra, a pipe ought to be placed in the canal, and, by rings affixed to it, sustained therein for at least two months.

In our own country, the operation has been practised by Professor Sewell ; by Mr. Snewing, of Coventry ; Daws, of London ; Bailey, of Culoden ; Hutton, of Winterton ; Dyer, of Jersey ; Spencer, of Scotland ; Woodger, of London ; Cartwright, of Whitchurch ; Lewis, of Monmouth, &c.

Mr. Sewell's patient—whose case I extract from the 'Farrier and Naturalist' for 1828—was a horse sent to the College by Messrs. Hanbury, with the penis hanging down, out of the sheath, considerably swollen and excoriated, apparently occasioned by a stricture of the prepuce. This, in the course of a couple of months, by leeches, Goulard lotion, bread and water poultices, fomentations, scarifications, suspensory bandages, purges, diuretics, and rowels, was relieved, and the

horse was discharged. A fortnight afterwards he was readmitted, with the penis swollen again, supposed to have been occasioned by some stimulating application having been used to the part. Some such treatment as had been before employed was recurred to, with the addition of blood-letting from the femoral vein, and the exhibition of doses of powdered white hellebore in water. Six weeks after admission, Mr. Sewell amputated the penis "by slow and cautious cuts," alternating the cuts with cauterizations. Considerable hemorrhage followed the operation. After three weeks' further treatment, the horse was sent away with "enlargement and thickening of the sheath," though reduced from what it had been; "the part originally diseased still remaining."

Mr. Snewing's ('VETERINARIAN,' vol. xi, p. 568) patient was an aged pony which had been purchased ten days prior to the operation by his present owner, who, on riding him home, discovered, while he was in the act of staling, the penis unusually projected, but took no further notice of this until he came to alight, when he perceived the yard still drawn, and that it was bloody: there were also visible around the margin of the sheath marks of stitches, rendering it evident that means had been taken to brace up the organ, which, from some cause, had become incapable of being retracted. Vexed at the trick that had been played him, he sent for the knacker to despatch the pony; the knacker, however, in a laudable spirit of humanity and disinterestedness, persuaded him first to seek medical advice. Mr. Snewing was sent for, and found the poor animal much emaciated, with "a mass of corruption"—as the owner described it—hanging from his belly, which was found to be a portion of penis in a state of ulceration, or rather gone on to gangrene, discharging "a thin watery sanious fluid, with blood, and highly offensive matter."—"There was also present what may be considered paraphymosis, arising from serous infiltration into the cellular tissue which connects together the convolutions of the sheath, producing strangury of the lower end of the penis." Mr. Snewing concluded that nothing but amputation close up to the groin could offer any chance of relief. Having washed the parts with a solution of chloride of lime to destroy the fetor, he included, by means of the caustic clams, between two long thin pieces of iron, the upper parts of the sheath and penis, and approximated their ends with strings sufficiently close to make the required compression. "I next proceeded," continues Mr. Snewing, "cautiously to incise the lower portion, securing by ligature in my progress the pudic arteries, and other vessels of importance. Near to the side of the penis I met with an encysted tumour, containing some thick crude offensive matter. On cutting through the urethra, a purulent matter escaped. Another cut carried my scalpel through the penis, which, by its retraction, prevented me securing a vessel on its dorsum, and which continued to bleed rather freely for a few minutes;

partly, I presume, from the corpora cavernosa. Having completed the operation and released the animal from the rope, he got up immediately. I had him led into the stable, and though the parts then bled freely, in ten minutes the hemorrhage had ceased, and no untoward symptom afterwards made it appearance."

Mr. Daws ('*VETERINARIAN*,' vol. xv, p. 38), V.S., London, operated on a cart stallion, twenty years old. He had experienced an attack of "spasms of the bowels." This had left continued erection of the penis with constant desire to void urine. The penis became enormously swollen and hard from interstitial deposition, and was beset with "many irregular unhealthy ulcerations." It was determined to amputate. To prevent the retraction of the stump of the amputated penis, Mr. Daws "passed a straight-pointed scalpel through the substance of the penis, a little above the urethra, and, at one incision, divided the corpora cavernosa and the vessels on its dorsum, close to the prepuce." The hemorrhage from the pudic arteries was not so much as might have been expected, and was speedily arrested by the judicious application of the actual cautery. The urethra and corpus spongiosum were now divided, and the stump immediately retracted.

Mr. Hutton ('*VETERINARIAN*,' vol. xv, p. 199), V.S., Winterton, attended a pony with "a large tumour, of a schirrous nature, on and quite round the lower and membranous part of the penis." He removed the tumour, "cutting into the integuments nearly round in so doing." He then brought the edges of the skin in apposition to each other, and confined them by sutures. Under physic, low diet, &c., the patient soon recovered.

Mr. Bailey ('*VETERINARIAN*,' vol. xv, p. 451), late 1st R.I. Lancers, was called to a cart-gelding, ten years old, "which was unable to retract his penis from an enlargement at the end of it." He had "extensive schirrus of the glans penis and prepuce: the penis dangling between the hocks, presenting an exceedingly disgusting spectacle." I recommended amputation. "I passed a ligature about four or five inches above the schirrus (which allowed of an assistant more securely grasping the stump that would be left), and then proceeded to abscission of the extremity by a sweeping stroke of a long bistoury through the substance of the penis, about three inches above the affected part. After due application of the cautery, I removed the ligature, and hemorrhage from the larger vessels being arrested, I allowed the horse to rise." The case did well.

Mr. Dyer's case ('*VETERINARIAN*,' vol. xviii, p. 438) was one of warts and chancreous condition of the glans penis, with discharge from it, which rendered amputation advisable. Mr. Dyer excised four inches of the penis with a bistoury. The part bled profusely afterwards for six hours,

no cautery or anything else being used, saving dashing cold water over the parts after the operation. The horse did well.

Mr. Spencer ('*VETERINARIAN*,' vol. xviii, p. 492), V.S., Scotland, consulted Professor Dick on the case of a cob, who for three years had been affected with ulceration of the penis, which was frequently attended with hemorrhage, quite alarming. After drawing and cleansing the penis, Mr. Spencer "took a strong piece of tape, and made it fast round the sound portion of the penis;" and, while this was held, "removed, with one stroke of the bistoury, in the same manner as I have seen you (Professor Dick) operate." The larger vessels, which were distinctly seen, were secured (with ligatures), while the smaller one were "gently cauterized."

Mr. Woodger ('*VETERINARIAN*,' vol. xviii, p. 619), V.S., London, has performed this operation several times. A thorough-bred entire horse had "a schirrous enlargement surrounding the penis, situated about six inches from the glans, and above three times the natural thickness of the penis itself, which rendered it impossible for the horse to retract it; consequently, the appearance was most unsightly, and prevented the owner from working him." In operating, "I took the glans in my left hand, and with my right made one bold cut, which severed about nine inches of penis, with the exception of a little of the outer covering, which I left to hold until I had slightly cauterized the bleeding vessels." The animal did well. "In the various cases upon which I have operated, I have not found it necessary to delay the operation by securing the larger vessels; but have simply applied the cautery to the whole. I should apprehend but little danger even if the entire penis was simply divided, and no cautery at all applied or ligature either."

Mr. Cartwright ('*VETERINARIAN*,' vol. xxiii, p. 21), V.S., Whitchurch, operated on a pony, eighteen years old, which had been ailing for some time from schirrous and cancerous condition of the glans penis. A ligature being put above the diseased part, around the penis, and the organ held fast by an assistant, "I plunged a sharp-pointed bistoury through its centre, and separated one half of it, and applied the cautery to its surface; I then separated the other half, and applied the cautery to it likewise." All went on well ultimately, though there was a recurrence of the hemorrhage, calling for re-application of the cautery.

Mr. Lewis ('*VETERINARIAN*,' vol. xxvi, p. 72), V.S., Monmouth, was shown a cart-horse with a cancerous glans penis, involving the prepuce, which was enormously enlarged and ulcerated. He had had the disease for two years. He urinated with difficulty, and the urine was spread in all directions. Having washed the part to destroy the fetor which was intolerable, Mr. Lewis proceeded to amputate; but no vessels made their appearance in the course of operation; not even after the removal of the

ligature. The horse did not lose altogether $\frac{3}{4}$ iv of blood. Mr. Lewis mentioned the circumstance to a surgeon, who informed him that he had seen the same want of hemorrhage in the human subject when amputating: "the retraction being so forcible as to render ligatures needless."

DISEASES OF THE ORGANS OF GENERATION OF THE FEMALE.

From the state of inaction in which these organs remain in all mares save such as are kept for the purposes of breeding, they are not, any more than those of the male, found to be the seat of much disease: a circumstance quite in accordance with the general law of nature, which almost exempts that from derangement whose functions are suffered to lie dormant or are but rarely called into action. In breeding counties and establishments, no doubt, diseases of these parts are occasionally met with; but in common localities, where no breeding is carried on, cases of the kind are but of rare occurrence: so that any account of the diseases connected with parturition, at the same time that it can prove of service only to the veterinarian in the former situation, can by him alone be accurately given. In ordinary practice we now and then meet with cases of

VAGINITIS AND LEUCORRHŒA.

VAGINITIS is the technical denomination for any inflammation, acute or chronic, existing in the vagina, while *leucorrhœa* and *fluor albus* are—the one Greek, the other Latin—appellations given to the morbid discharges issuing from the vaginal cavity, which are generally white, and ordinarily concomitant with, though sometimes unaccompanied by, and at other times remaining after, the inflammation of its mucous lining; the same, in point of fact, as happens in the nose or bladder, or any other mucous cavity, it being nothing more, in pathology, than *a catarrh of the vagina*. Although mares in common use, not being allowed to breed, are never put to the horse, still, as the warm and

copulating season annually returns, do they—or most of them—feel a relapse of the venereal œstrum, and during its continuance experience a sort of seminal emission, which is evidence to us that the female is in a condition to take the male. From causes which are not always evident, it would appear that this natural discharge occasionally continues much beyond its ordinary duration, assumes other than its natural characters, or comes on, contrary to habit, at the cold or winter season of the year, when its presence cannot be regarded as owing to normal causes, or as manifesting the usual indications. I have known several instances of derangement of this kind. In some, the discharge has appeared white like whey; in others it has assumed a yellow and even purulent character; very often the flux, though at first white or yellow, turns to a thin colourless emission, in appearance like water. The discharge collects within the fossa navicularis, and comes away every time the lips of the vulva are opened, in a sort of gush. In general, there is not much concomitant reddening of the inside of the vagina; in some cases only a faint blush, or there may be none whatever. In these cases, I have found serviceable such medicines as are known to allay the irritability of mucous membranes and restrain their discharges: I have given, once or twice a day, a ball according to one of the subjoined formulæ.

R Plumbi Acetat., ʒj;
 Opii, ʒj;
 Farinæ, ʒss;
 Tereb. com. q. s. ut fiat bol.

R Cantharidum, gr. v;
 Farinæ, ʒj;
 Balsam. Copaibæ q. s. ut fiat bol.

At the same time the practitioner should use—unless existing inflammation forbid it—an astringent injection four or five or six times a day. And, in addition, he will find useful cold affusion, or, where it can be had, cold bathing.

R Cupri Sulphat., ʒj—ʒiij;
 Aquæ Distillat., Oj.
 M. pro injectione.

R Decoction. Cinchonæ, ʒj
 (double strength);
 Acid. Sulphuric., ʒj.
 M. pro injectione.

It is advisable to sprinkle common flour over the external

genitals and thighs after using the injection, to prevent excoriation. The watery issue will sometimes continue for weeks after the white running has ceased, and prove very troublesome to suppress.

Vaginitis, in its acute form, in the absence of any external injury, I take to be a disease hardly ever occurring, unless it be in breeding mares, in whom such an affection would be likely to follow some of the accidents liable to occur in the act of parturition: but of such occurrences I can only speak from hearsay, not being in the way myself of meeting with labour cases.

Mr. Fitter, M.R.C.V.S., Wolverhampton, relates a case of leucorrhœa, in 'THE VETERINARIAN' for November, 1849. This is a disease not so prevalent in the animal as gonorrhœa. The distinctive characters of these diseases are—in gonorrhœa the discharge is constant, but in small quantities, and there is much itching of the pudendum, and swelling of the labia; and I have frequently seen, says Mr. Fitter, ulceration of these parts. The mare is often at *œstrum*, there seems to be an increased desire to venery; whereas, in leucorrhœa, the discharge is irregular and in considerable quantities, and is neither preceded by, nor accompanied with, any inflammatory symptom.

Mr. Fitter was requested to give his opinion about a hackney-mare, having a profuse discharge from the vagina, of a thick, yellow, shining nature, coming away "to the extent of more than half a gallon a day." The mare had been put to horse, and about six weeks after showed the discharge. Several mares had been put to the same horse without any such consequences. The discharge collects in the fossa navicularis, and comes away by gushes. The sides of the vulva become agglutinated by the discharge. The mucous membrane appeared rather blanched than inflamed. The discharge ran down the thighs. The organs of generation in this mare are evidently very small, so that there is no doubt but that force *in coitu* has occasioned irritation in the membrane. The gentleman who kept the entire horse had a mare die from such cause. Mr. Fitter first gave the

mare physic, and used a zinc injection with the patent enema syringe ; and after the physic had quite set, administered a ball, daily, composed of ʒij of Ferri Sulphas ; half a drachm of Zingiber and Gentian ; Pulv. Conii and Mass. Com., a drachm and a half each ; with sufficient Copaiba to form a ball : a ball I can strongly recommend for imitation.

This treatment, increasing the injections in quantity, was persevered in for two months, when she was perfectly restored to health, and has so remained. Previous to convalescence, the discharge turned *white* and *pellucid*, then gradually disappeared.

SCIRRHOUS TUMOUR UPON THE VULVA.—The Compte Rendu of the Transactions of the Veterinary School at Lyons, for the session 1837-8, contains the following remarkable case :

A draught mare, employed in farming, six years old, that had never bred, exhibited a carcinomatous enlargement growing in the inferior commissure of her vulva, which had existed for two years. It being in a state of inflammation, she kicked violently when it was meddled with ; and what with the irritation of the urine, the brushing of the tail upon it, and the pungency of the remedies that had been applied, the tumour had been rendered greater. When first brought to the school, the swelling measured two inches across, and had irregular, indurated, fetid ulcerations upon it. Simple treatment with lotions appeared to stay its progress for a time ; but on her second visit, six months afterwards, the tumour was found to occupy at least two thirds of the entire vulva, and had assumed the aspect of schirrus, beset with tubercles and ulcers. To do any good in this state, excision of at least two thirds of the labia became necessary. The mammary glands were found to have partaken of the schirrous action. They were rubbed with mercurial and iodine ointment. Ill-conditioned purulent discharges succeeded the operation ; the appetite began to fail ; loss of flesh followed, with dropsical swellings of the legs and belly ; and the local affection was becoming cancerous : she was in consequence destroyed.

Post-mortem.—The vaginal membrane deeply reddened and atrophied : an incision through it discovered a lardaceous tissue, studded with tubercles, with some surrounding infiltration. The mammary glands were in the first stage towards schirrus. This case shows how long a cancerous affection may exist in, and confine itself to, one spot ; for it was in the last stage only that this spread to the udder.

HYSTERITIS OR METRITIS.

INFLAMMATION of the womb appears to be no uncommon disease in cows, but one of rare occurrence in mares : at least this is the inference we may fairly draw from the great deal we hear about the one, and the little, or comparatively nothing, we hear or know concerning the other. Indeed, it is only to such veterinarians as are engaged in practice in parts of the country where breeding is carried on, that cases of hysteritis are likely to occur ; since we know of no other causes for inflammation of the womb save such as are directly or indirectly connected with utero-gestation and parturition. The following case, published in 'THE VETERINARIAN' for 1833, by Mr. Barker, V.S., Stokesly, Yorkshire, is interesting, as well from its rarity as from its characteristic and strongly-marked symptoms and result, notwithstanding the account is but a brief one :

"Sept. 3d, 1833," says Mr. Barker, "I was sent for to a mare that had been ill all day. The principal symptoms were, lying down and getting up ; lifting one hind leg and then the other ; with a discharge of bloody fluid from the vagina. Pulse 80. She had been bled ; but I took away eight quarts of blood more. I gave her an opiate enema, containing four ounces of tincture of opium, and two ounces of spirit of nitrous ether, in gruel ; and an hour afterwards she had a ball, containing three drachms of aloes, with ten grains of calomel.—Sept. 4th. Pulse 75. I again bled her, and gave her a laxative ball, containing two drachms of aloes : a laxative enema was also administered.—Sept. 5th. Pulse 48. Give two drachms of aloes.—Sept. 6th. She is well, and gone to grass."

Were I to venture an opinion on a case I had never seen, I should say that, in the treatment of the one above related, a *full dose* of cathartic medicine might, with advantage, have been administered in the first instance : in other respects, the management of the case appears to me extremely judicious.

Since this was published, another account of the disease occurring in practice, and a very interesting one, has reached 'THE VETERINARIAN' (vol. xvii, p. 177), from Mr. Copeman, V.S., Halesworth.

"The meagre state of our literature in regard to this disease in the mare—for, indeed, British writers are almost all silent on it—would seem to afford incontestible proof that it is a disease of rare occurrence; though I am inclined to think that in the breeding districts such is not really the case."

Jan. 11th, 1844, Mr. Copeman was requested to see a seven-year-old cart-mare, in good condition. She had aborted twin foals on the night of the 9th; but as her appetite continued, no notice was taken of her until this afternoon. There was now a slight rigor; body bedewed in patches with sweat; looks gloomy and depressed; at times she becomes uneasy; frequently lies down; looks at her flanks; but without violence or attempt to roll on her back; walk stiffly, and with back rounded; no appetite. Pulse 85, hard and compressible; visible mucous tissues highly injected; vagina red, and discharging a fetid, bloody fluid; with pus quite normal. Bled largely; clothed warmly; full dose of physic; bran mash. 12th. Better. 13th. Improving. Fever ball. In a few days after convalescent.

OBSERVATION.—In all the cases of hysteritis Mr. Copeman has treated, bloodletting has been borne surprisingly well. The symptoms resemble those of colic and enteritis; but the sufferings are not so acute as in either of those diseases. The disease generally occurs between the second and fourth days after delivery. The fetid discharge from the vagina, and the stiff awkward gait, will assist very much in distinguishing it from enteritis; while for colic it never can be mistaken, by one who pays any diligent attention to such a case.

HYSTERIA.

Dr. Cullen has described four *species* under the *genus Hysteria*, viz., *hysteria chlorotica*, *hysteria leucorrhœa*; *hysteria menorrhagia*; *hysteria libidinosa*, of which *nymphomania* denominates excess.

Windsor Barracks, May 8th, 1850.—A case of the latter has just occurred in a mare in C troop (No. 27). This mare has been noted for being more than usually excitable at the spring of the year, and during the horsing season; and appears to have shown this the more apparently, from the circumstance of her being known to be, *by nature*, a violent, highly-excitable mare. She has often bolted and run away with her rider, and on one occasion started out of the ranks of the Queen's guard, in St. James's Park, and ran with her rider against the mortar on the parade in front of the Horse Guards. She is now in the greatest state of excitement; is continually switching her tail about; ejecting, *vaginæ*, from time to time, somewhere about half a pint of a yellow creamy matter; having her eyes full of the aspect of wild suspicion, appearing as if starting from her head; and is exceedingly dangerous of approach: she being continually in motion, and on the watch for any one who comes near her. By quiet means, she was, after a time, bridled, and led by a man who was a stranger to her, (for she would not suffer her own man to come near her) from her stable into a box; and then she was tied up with two halters, to stand, without food and water, until her maniacal fit should subside. This, however, availed but little or nothing. She was put to horse—to a stallion at Cumberland Lodge—whom she took on two occasions; which tranquillised her. But still she remained fidgety and restless, and on that account was ultimately sold.

Hurtrel d'Arboval asks, if the following case cannot be considered of this nature. It occurred to M. Guillaume, and was published in the 'Mémoires de la Société Royal et Centrale d'Agriculture' for 1825.

A female ass shewed signs of horsing, in conjunction with some tetanic indications, which were referred to the presence of the venereal orgasm : among these were clenching of the jaws, grinding of the teeth, tardy and difficult mastication, and inconvenience in swallowing. At first the male was denied her. She was bled, and took a nitred decoction of valerian with sulphuric acid, and had enemata of assafetida dissolved in sulphuric acid, and frictions with camphorated liniment upon the cheeks, neck, and back and loins, which dissipated the nervous disorder ; but left the horsing as before. She was now given a stallion ass ; she took him, became with foal, and from that day recovered.

Mr. HAYCOCK, V.S., Huddersfield, has written an Essay ‘On Hysteria in the Mare ;’ the deductions I have drawn from the facts detailed in which are the following :—If Mr. Haycock’s disease anywise assume the hysterical character, it is when hysteria puts on the garb of the irregular and anomalous disease, leaving all but untouched and undisturbed the generative organs. Dr. Copland’s pathology of hysteria is, “That hysteria arises from the state of the organic nervous influence, *endowing the generative organs of the female, and that a similar state of the sexual organs of the male very rarely occasions it,*” &c. And Dr. Elliotson, in his ‘Lectures on the Principles and Practice of Medicine,’ says, “This (hysteria) is a disease which occurs much more frequently in females than in males ; and in females particularly during their *sexual* period, if I may so call it,” &c. “Any woman may have hysteria if she can have but *emotion of mind* enough.” Mr. Haycock’s cases owe their origin to neither mental affection nor to any excitement or abnormality of the sexual organs. In only one of the cases (case IV) were any symptoms manifested of the mare being “in use for the horse :” the others are nervous, convulsive, or spasmodic affections, which, though called “hysteria,” were wanting in some important requisites to make up that affection, properly so called ; such as no choking and *globus hystericus* (wanting perhaps, from the circumstance of the horse not being an animal capable of vomition), no pale, limpid urine ; only a *single one* instead of a succession of fits ; a *fatal* disease ; although “simple and pure hysteria,” as Dr. Copland says, “is rarely or almost

never fatal." But what appears to us (allopathists) most extraordinary of all, is, that the two cases that died were treated *allopathically*, or, in the language of our school, *secundum artem*; whereas, the four horses which recovered took *homœopathic* doses of belladonna, aconite, mercurius, pulsatilla! &c.

HYDROMETRA.

Of the extremely rare disease, *dropsy of the womb*, a case is chronicled by Gohier.

The uterus of an old mare grew so large that it spread and occupied the anterior region of the abdomen, and gave her the appearance of being with foal. This was found to be owing to distension of the uterus with six quarts of thick white matter, similar to what would be called laudable pus.

PROLAPSUS AND INVERSION OF THE UTERUS.—These are subjects which properly belong to *Veterinary Obstetrics*.

DISEASES OF THE OVARIES.

The late much-respected Mr. Mayer, sen., introduced to our notice a case of "Diseased Ovaria," which he sent to 'THE VETERINARIAN,' in 1837, with the following sensible observations, for guiding our practice, in those and other obscure abdominal ailments:—"Unfortunately, the ovarium goes through its early derangement and alteration of structure before we suspect, or are aware of, the true nature of the disease, until we make an early examination *per-rectum*, which we *ought always to do* in what appears obscure bowel affections." In the early stages of the disease, there will, I think, be detected slight and occasional griping pains, from time to time, accompanied with febrile action. The urinary organs likewise would, from sympathy, be temporarily deranged, and the bladder more irritable. But, to the common observer, this would be lost

sight of, or merge into "gripes." Nor would the true nature of the case be suspected, until the enlargement had increased so far as to protrude into the pubis, and, by its pressure upon the rectum and urethra, form a partial impediment to the free course of the fæces and urine. At the same time, the labia pudendi become thickened and enlarged, and their absorbents and blood-vessels in a varicose condition; forming a strong diagnostic symptom, conjointly with the others already enumerated. "And all would be attended, as the disease progressed with falling away and emaciation."

The CAUSES of this particular disease are very obscure. Some constitutions are more prone to glandular affections and disease than others; but why, we cannot tell. In the human subject, one of the most frequent exciting causes is an excess in venery.

The TREATMENT should consist in keeping the fæces soluble by the least irritating processes, such as Ol. Lini., Sal. Glaub., Sal. Epsom., &c., at the same time pushing to the utmost the administration of hydriodate of potash, conjoined with that of hemlock. The diet ought to consist of flax-seed mash, nice hay, and, when the season allows, green-meat. Whenever the animal is attacked with much occasional pain and with rolling about from its urgency, depletion may be had recourse to, according to the violence of the symptoms: hot fomentations to the pubic region; frequent warm clysters; antiphlogistic remedies externally, until such symptoms be removed, when the previous treatment must be steadily resorted to again. No mare ought to be allowed to be put to the horse in such a condition.

In a case Mr. Mayer had occasion to attend, of a half-bred mare, the post-mortem appearances were these: "On opening the abdomen, there was nothing particular in view except the large intestines; but as soon as these were turned to one side, a very considerable tumour presented itself, appearing not only to occupy the cavity of the pelvis, but likewise the regio pubis, stretching itself along the left side of the lumbar region, as far as the left kidney: the other

portion, pointing towards the right lumbar region, occupied no more than the pubic division of the abdomen. The right kidney appeared diminished in size, of a leaden hue, and much firmer to the touch than natural; the left kidney was enlarged, but exhibited externally its natural healthy appearance.

“The parts surrounding the whole were now carefully taken out, and, on a minute examination, I found that the ovaria had become diseased; that, on the left, being scirrhus, and the other in a state of dropsy. As the scirrhus ovarium, from its great size, was completely wedged into the pelvic cavity, I was necessitated to divide the symphysis pubis before I could get a clear view of its dimensions, and disengage it from its attachment. Its shape was triangular, two angles being directed into the abdominal cavity, and the third into the pelvic cavity, occupying the greater portion of it. It had completely lost all vestige of its original and natural structure, and presented one extended homogeneous yellow-coloured scirrhus mass, not weighing less than from twenty to twenty-five pounds, and connecting itself by a kind of projecting isthmus across to the opposite ovarium and fallopian tubes. When cut into, it was found made up of a congeries of abscesses, each having a distinct sac, the walls of which were composed of half-organized lymph. The right ovarium retained its natural structure, was very vascular, was enlarged to the size of a large foot-ball, and distended with a serous fluid. How far this latter phenomenon depended upon the impregnated state of the uterus, as the mare was in foal (the foetus being about the size of a cat) I do not know. This circumstance was very remarkable, as clearly showing the capability of one ovarium being perfectly competent to the fulfilling of the functions of generation in the female, the same as one testicle is in the male: a wise provision of Nature, one showing how providently her arrangements are made for the propagation of every species of animal. On making a section of the left kidney, no trace of disease evinced itself; but, on cutting through the right one, it was found in a complete scirrhus, disorganized condition,

full of small tubercles, situated at the origin and along the course of the tubuli uriniferi ; so that it must have been quite incapable of performing its functions."

The following very instructive case comes from Mr. Wm. Field.

Scirrhus enlargement of one ovary, accompanied by ascites.

—A bay mare, the property of the Hon. Jas. Norton, was sent to Mr. Field's hospital for horses, on the 1st June last. She was, from the circumstance of her belly having undergone, of late, visible enlargement, suspected to be with foal ; though from her present owner having not long ago purchased her, there were no very ready means of ascertaining whether she had been to any horse. The mare exhibits no pain nor ill health, save that she is losing flesh ; and on that account needs something to afford her relief.

"The enlarged abdomen was the only *visible* symptom Mr. Field had for his guidance ; and although this was unaccompanied by any œdema of the belly, breast, or legs, yet did careful examination of it convince Mr. Field that it indicated neither more nor less than ascites ; at the same time, it led to the discovery of a tumour in the interval between the ileum, transverse lumbar processes, and ribs, which, from its situation, he took to be an enlarged ovary : and such it proved to be. Acting on this firm belief, he tapped the mare, and drew off four gallons of fluid. This had but little if any effect upon her, either for good or ill. She had all along breathed tranquilly, and had an undisturbed pulse : still, she continued to lose flesh, and was evidently, altogether, in a hopeless condition. Mr. Field, willing to give her every chance, sent her away to his farm, where she remained six weeks. Her belly during this interval growing large again, she was tapped a second time, and had, as before, four gallons of fluid withdrawn. After this she was put to death. In addition to what had been drawn off, thirty-two gallons of fluid were found within the peritoneal cavity ; there was also discovered, on the near side, a scirrhus ovary, of the magnitude of a man's head, and of a globular form, weighing twenty-two pounds. Contrasted with its fellow ovary,

which, perhaps, was somewhat smaller than natural, it looked in point of size like a pumpkin by the side of a walnut.

“The tumour, cut in half, presented surfaces of a marbled aspect: an appearance produced by an ash-coloured substance, of which it was almost entirely composed, being crossed and intersected in every direction by white fibrous bands, issuing at short intervals one from another, from the inner surface of the proper tunic of the ovary, by which its component substance was irregularly partitioned into numberless compartments of all shapes and sizes; the ash-coloured substance itself exhibiting more toughness than firmness, and looking like organized and converted albuminous deposit. In the centre, the tumour had undergone the ulcerous degeneration. There was an irregular cavity, presenting the appearance of having had its origin in two or more abscesses ulcerating into one, which, altogether, contained about a tea-cupful of purulent matter, looking like good laudable fluid pus, without any grumous or caseous admixture. The tunic of the ovary had grown with the tumour, and acquired thickness and strength with its increased growth, and presented a fibrous character. The blood-vessels had likewise undergone proportionate augmentation. Altogether, the case turned out an exceedingly interesting one.”

The following cases comprise all the information I have been able to collect in this fallow-field of hippopathology: nine of them are quoted by D'Arboval—seven from M. Bouley, junior, the eighth from Lapoussée—the tenth is taken from the *Recueil de Médecine Vétérinaire*.

1. A mare, five years old, who had been eight days ailing, appeared suffering under slight colic: her tail shook, she walked stiffly, her belly was swollen, her back roached, and a fetid sanious issue escaped from her vulva; the udder also was tumefied, and, by compression, yielded a serous lactescent exudation. It was suspected she had metritis, having but a little while before foaled. Antiphlogistic treatment produced sensible amelioration at first; but at the end of four days her fever and colics returned, the pulse became imperceptible, and on the sixth day she expired. A large quantity of red fluid was found effused into the abdomen; the visceral surfaces of the peritoneum presented evident traces of

inflammation; the womb contained sanious matter; its mucous membrane appeared in folds, reddened and thickened; the right ovary was converted into a soft spheroid tumour, seven pounds in weight, and contained a blueish homogeneous, odourless fluid; and its parietes, which had become much attenuated, were reddened and injected. The left ovary was double its natural volume, and contained several serous cysts.

2. Another mare, four years old, fell suddenly ill. Diminished appetite and gaiety were the only symptoms at first observed. These excited no apprehension until the fourth day, when they assumed an alarming character. The mare became gloomy and depressed, refused every kind of food, and appeared suffering some abdominal pain; her pulse was 70, and rather full; she walked stiffly, and had some difficulty in dunging; and her dung was shiny. Notwithstanding she was bled, for three days there appeared no change. After this, all her symptoms became exasperated: the colics more frequent and intense; the pulse quicker and less perceptible; partial sweats bedewed the flanks; the belly seemed full of pain, particularly about the left flank; the loins were tense and inflexible. On the 10th day she died. The stomach and small intestines proved slightly inflamed. The left ovary was no longer in existence: a soft round mass, six pounds in weight, occupied its place, which contained a grayish, granulous, slightly odorous pus, and had fibrous parietes, thickened and injected. The mucous lining of the womb was likewise reddened and thickened. The right ovary, much larger than natural, consisted of a great number of small serous cysts.

3. A harness-mare, who had been at work for two years without experiencing the slightest indisposition, was suddenly, and without any manifest cause, seized with a disease which in a very short time proved fatal. The only symptoms at first were a slight rigor and breaking out into a sweat, with, some moments afterwards, slabbering and foaming at the mouth. Subsequently, the pulse became all but imperceptible, sinking under the fingers; the membranes colourless; extremities cold; and death ensued at the expiration of some minutes. A large quantity of blood found effused into the abdomen. A considerable tumour occupied the sub-lumbar region, continuous in substance with the right horn of the uterus. This tumour, twenty-four pounds in weight, was of an oblong shape, and exhibited at the anterior part a rupture occupied by a clot of blood, from which had proceeded the hemorrhage, the cause of death. Its tissue, white and homogeneous, was softened in the centre, where was found a small quantity of encephaloid matter. Its parietes, generally fibrous, varied in density, and in some places had the consistence of cartilage.

4. A mare, aged, had a chronic enlargement of the right hind leg, which after some months disappeared spontaneously; but the belly, which

was also large, still remained so, and without any announcements of foaling being near. For some years she did her work excellently well, when all on a sudden she was seized with violent colics, from which she died in less than six hours. An encysted tumour of the left ovary occupied a great part of the cavity of the abdomen, where it had contracted adhesions with the omentum. This tumour, weighing forty-six pounds, slightly flattened above and below, presented a bright red surface and rounded borders, and contained some clots of blood, and a large quantity of granulous, inodorous liquid, of the colour of wine-lees. Its parietes, which were mostly fibro-cartilaginous, were in some places osseous. A false membrane, two or three lines in thickness, lined its cavity, which was covered with a red matter, looking like the sediment of the liquid within. The right ovary was triple its ordinary volume.

5. Violent colics seized during the night an aged mare, who died the following morning. The left ovary had become changed into an encysted tumour, weighing twenty-eight pounds, with its capsule, and was ruptured to the extent of about eight centimetres. Considerable hemorrhage had taken place into the abdominal cavity. The contents of the tumour were a grayish odourless matter.

6. A mare, nine years of age, suddenly attacked with sharp colic, died in the space of a few hours. The abdominal viscera were found bathed in blood, and the right ovary was converted into an encysted tumour of the weight of 24 lbs. The fibrous covering of the tumour, thickened in places, presented a rupture through which the blood had escaped.

7. A mare, eleven years old, had been ill for some hours, manifesting all the signs of slight enteritis—pawing and looking at her belly, and lying down—with a pulse hard and but little accelerated, and much fuller than it ordinarily is in abdominal affections, and a troublesome tenesmus, which caused violent straining and the discharge of a considerable quantity of mucous matter. In spite of all treatment the colic continued for two days, and then all the symptoms subsided as it were by an act of enchantment. Evacuations returned, the spirits returned, and the appetite returned. But in two days more the complaint returned, and with increased violence, which nothing could subdue, until terminated by death on the 6th day afterwards. The right ovary, formed into a cyst, had contracted an extensive though lax adhesion with the arch of the colon, with the functions of which, in its usual situation, it must in consequence have interfered, had it not in some unaccountable manner changed its position and got above instead of below the gut, and from the right to the left side, where it had embraced and drawn it down upon the pubes, and caused an internal strangulation of the intestine, in whose cavity were found masses of dried dung. Within the tumour was a large quantity of limpid inodorous fluid; and embedded in its coats were several serous cysts, and some melanotic tumours.

A case of a female ass is reported by M. Lapoussée. Ever since she had foaled, she had at times emitted blood from the vulva; but as this did not appear to injure her, little notice was taken of it. After four months she was seized with violent colic, while suffering from which she emitted blood in rapid jets, black and partly coagulated. The vagina was red and very hot; the abdomen somewhat distended; the pulse small; extremities cold; and weakness prevailed to that degree that the animal could hardly stand. The next morning the hemorrhage returned, and on the fourth day from that the ass died. The mucous membranes of the vagina and nose were violet-coloured, that of the uterus presenting general traces of inflammation, with some gangrenous spots, particularly within the left horn. The ovary, much enlarged, contained a mass of black fetid blood, which, during life, must have passed into the womb through the Fallopian tube, whose caliber was double that natural to it.

In the *Recueil de Médecine Vétérinaire*, we read of the post-mortem examination of a mare in whom was found a tumour weighing 32 lb. growing from the left horn of the uterus, and consisting of a degenerated ovary. It presented all the anatomical characters of scirrhus, with an appearance of cancer in some places; but, in more, of clots of blood. A cyst, formed in one of the sides of the tumour, enclosed a saline substance, mingled with hair, which we looked upon as the *débris* of a fœtus that had become developed in an ovarian vesicle.

These highly interesting and valuable observations, remarks D'Arboval, coupled with some accounts of the symptoms during life, may not suffice to enable us to trace unerringly the history of diseases of the ovary; but they will serve to erect a standard upon, around which other facts may be ranged, which, collectively, will one day fill up this hiatus in hippo-pathology. We, at least, learn from them—that such diseases may exist either in an acute or a chronic form; that those of the first class give rise to much the same symptoms as denote peritonitis and metritis;—that the others, not indicated by any appreciable symptoms, lay the foundation for tumours of considerable volume, which may exist without disturbance of function;—and that the acute affections are likely to end in resolution, though they may terminate in suppuration, or run into the chronic stage, after which any of those organic alterations may ensue which take place in other parts; and, lastly, that when the tumour

bursts and discharges its contents into the abdomen, death becomes inevitable.

CASTRATION.

British custom has so universally established the practice of castration, that, with the exception of the comparatively small number of horses kept for the purposes of racing and covering, every male horse in our own country may be said to be a gelding.¹ With us, the colt is emasculated at a very early period of his life, before the testicles have acquired any glandular or secretory power, and, consequently, before any of those remarkable phenomena, which it is well known attend on the production of semen, have had opportunity of developing themselves. A comparison of the stone-horse with the gelding, cannot fail to demonstrate that the former is an animal in many respects of very superior pretensions to the latter. The gelding falls off in his physical structure no less than he dwindles down in his *vis vitæ* to much below what he would have proved as an entire animal. His neck loses its beautiful crest and powerful development; his quarters fall away in volume and plumpness; his penis and sheath look more like a remnant of such parts than the organs themselves; indeed, to such an extent in some horses that have been cut early does this degeneration proceed, that, without looking close, we hardly, at first sight, distinguish between the gelding and the mare. And, as to the head, so much has it lost of its original contour and expression, that we do not discover in our examinations of the mouth (before the tusks appear) whether we are looking at that of a mare or a gelding. The coat of the stallion is likewise of finer texture; added to which, he is in possession of a gracefulness of form and carriage and action, which he no longer retains in the eunuch condition; but, on the contrary, tame down into a comparatively mild, quiet, tractable animal, reduced in stamina and constitution, and, as a con-

¹ In France, such colts as are destined for draught, as well as for covering, are left entire; those only are cut which are destined for the saddle. The spaying of mares is prohibited by law—has been, since the year 1717—in consequence of its having proved the occasion of many deaths. (Hurtrel d'Arboval.)

sequence, rendered more liable to disease. Certainly, we obtain by castration the object we have in view, viz., more complete dominion over the animal and manageableness of him. But, in accomplishing this, we lose a great deal compared to the little we gain ;—so much, indeed, that it might fairly become a national question, why we, the same as foreign nations, cannot, for certain purposes and in certain situations, contrive to manage and do our work with entire horses.¹

To reduce the stone-horse, in point of nature, down to the gelding, it is not absolutely necessary to *extract* the testicles : any operation that will disorganize or destroy the functions of the gland, or that will even intercept the conduit of semen from it, will be attended with like effects, in the course of time, as so speedily follow on actual castration. A knowledge of this fact it is which has led to the practices of *bruising* the testicles, excising the epidydimes or portions of the spermatic duct, &c. The objections to such alternatives for castration are—that many of them create quite as much pain and irritation, and evil effect, as gelding itself does—some even more ; and that none of them so speedily and so completely accomplish the object we have in view as the absolute abstraction of the testicles.

CONCERNING THE BEST AGE for castration, there is some difference of opinion, arising, in a great measure, from viewing the subject through different media. The man who confines his views to the simplicity and safety of the operation, rightly argues, the *earlier* it is performed the better. Mr. Brettargh, V.S., Preston, in a letter to me, says, “Every spring since I left you at the College I have

¹ Castration has a strange effect. It emasculates man, beast, and bird, and brings them to a near resemblance to the other sex. Eunuchs have smooth and beardless chins, and squeaking voices. Wethers have small horns, like ewes, and oxen large bent horns, and hoarse voices when they low, like cows ; but bulls have short straight horns, and though they mutter and grumble in a deep tremulous voice, yet they low in a shrill high key. Capons have small combs and gills, and look like pullets about the head ; they walk without any parade, and hover on the chickens like the hen. Barrow hogs have likewise small tusks, like sows. (‘Veterinarian,’ vol. xx, p. 118.)

operated on foals at all ages, from ten days to four months old, and am convinced of that being the most eligible period.”—“Colts grow larger than when castrated later.”—“Colts are foaled with their testicles within the scrotum, wherein they remain, in ordinary cases, until the fifth or sixth month, at which period they are taken up between the internal and external abdominal rings, and continue concealed until the eleventh, twelfth, or thirteenth month, all depending upon the degree of keep; since in some, which are particularly well fed, the testicles can at all times be found within the scrotum.” This does not quite accord with the account D’Arboval gives: he tells us—“the horse cannot be castrated prior to the fourth or fifth month of his age, the testicles not appearing until then within the scrotum.” I am, not, myself, in a situation to resolve these apparently discrepant statements: extensive opportunities of observation in large breeding establishments can alone set us right in this—as it would appear as yet, not very much to our credit—simple though unascertained fact. In respect to the age of puberty in horses, we in general do not notice any manifestation of venereal desires prior to the second year. About this period these seem to become engendered: unless, therefore, it be intended that the colt should experience the effects of this change, I see no good reason for not operating at the *earliest* possible age: on the other hand, should there be a desire that the growing animal partake, either in his bodily frame, constitution, or temper, of the nature of the stallion, then, protraction of the operation beyond the period of puberty, or period when he first begins to notice mares, will become desirable to attain the object in view. I cannot myself discover any advantage or use in pursuing a middle course: it appears to me all nonsense to say this or that age is to be preferred, without having reference either to the operation itself, or to the influence of the testicles on the animal’s growth and economy. D’Arboval says that the horse will bear the operation so late as his twentieth year.

The METHODS OF CASTRATION practised at the present

day may be said to comprise seven different modes of procedure—by cauterization, by compression or by caustic, or by both in combination ; by ligature ; by torsion ; by scraping ; by the barbarous operation of plucking or “tearing out” the testicles with the hand, which was once practised upon horses, and still continues in use for small animals ; having been, at least as far as the former is concerned, very properly abandoned, though not so much on account of any danger, in proper hands, attending the operation, as from the unscientific and barbarous aspect such an operation puts on. The late Professor Coleman used to relate the case of an old stallion, in which this operation of laceration or tearing-out was executed with success. First, one testicle was torn out without any consequent alarming hemorrhage ; then, after the lapse of a few days, its fellow was extracted. Had both spermatic chords been lacerated, at the same operation, dangerous bleeding might probably have ensued.

IN REGARD TO SEASON AND WEATHER.—The operator ought—where he can—to object to castrate either during very cold or very sultry weather, or at the time when the horse is shedding his coat, or in the season when, or in the situation where, flies prevail. These precautions will especially demand attention should our subject be an aged horse, or one that has been up to the moment highly groomed or fed. The season to be preferred is, late in the spring, after the horse has shed his coat, and before the flies have begun to make their appearance.

PREPARATION of some sort is, in most cases, recommended ; and it is indispensable that the subject for operation be at the time in a state of sound health. Should he be a colt at grass, nothing beyond confining him in some place where he can procure nothing to eat for the twelve hours preceding the operation will be necessary. More than this will, however, be requisite when we have to deal with a colt or stone-horse standing in the stable, and particularly in the case of an aged stallion or one in high condition. In his case, mashing for some days, coupled with a dose of physic or two, may be called for, or bloodletting may seem advisable ;

attention being paid (as with the colt at grass) to keeping him fasting the night prior to operating, in order that he may in a measure unload his bowels; to ensure which a muzzle had better be put on him over-night.

PRE-EXAMINATION of the subject for hernia, is a precaution more demanded than any one I have mentioned. Should the horse have raced, or have been in training, or even have hunted, rupture is not unlikely to exist, and might, of course, tend to circumscribe or alter our views in regard to the operation. A judicious veterinarian will submit *all* subjects to manual exploration prior to their being cast, young as well as old; though he will so rarely meet with hernia in the unbroke colt that in his case it may look like a work of supererogation: still, it is possible that rupture, concealed, might exist, and therefore will the precautionary search turn out satisfactory, and, since it constitutes but the act of a minute, had better be observed.¹

FETTERING, CASTING, AND SECURING the subject for operation is an affair promptly and easily executed, when performed with method and suitable apparatus. It commonly happens that the veterinarian has to cut a colt unbroke;—perhaps one that has never been haltered. Supposing him to be out at grass, to be driven up into the corner of a field, or other place, the first thing to accomplish is, by coaxing or stratagem, to slip upon or over his head a flat hempen halter; with which it is advisable, should he prove very refractory, to tie him up to some strong place for a time, to give him an opportunity of expending some of the rebellious spirit we have roused in him—by hanging back and tugging at the halter-rope—prior to taking further liberties with him. In some cases, by way of a more effectual quietus, he may, by adding some lengths to the halter-rope, be longed for a while upon a dunghheap or ploughed field. As soon as he is rendered tranquil, or rather has become sullen enough to admit of approach to him, an attempt may be made to put a twitch upon his nose, or, that failing, upon his ear: not that this is in all cases necessary, or even prudential; some colts

¹ For the *tests* of Hernia, turn back to pp. 377-8.

proving more manageable without such painful expedient. In other cases, blinds prove excellent means of intimidation, and of the greatest service. Having led or *pushed* him to the place upon which we intend to cast him, providing we can manage to fasten hobbles¹ around his legs, he may be thrown and secured in the ordinary manner, care being taken that he falls, or is afterwards turned, upon his *off* side; which being done, the near hind leg is to be drawn up, either with a broad web or a hobble and side-line, against the shoulder, and as close to it as possible, and confined in that extended position by passing the web or rope, coming from it, around the neck, and from thence, a second time, by means of a half-hitch, around the heel, or else through the ring of the hobble: the remainder of the web or rope being made fast by a knot, or, what is better (when people are at hand), firmly held tight by one or two men. One man will be sufficient to maintain the extension of the other three legs: making the hobble-rope fast to any place, though often done where assistance is scarce, is not unattended with danger. In every case, a man will be required to take charge of the head, in order, the moment the colt falls, to cushion his knee forcibly in the hollow behind the ear, upon the side of the neck, in such manner as to be able to keep the head pressed down, while, with his hands, by protruding the muzzle, he prevents the animal from incurvating his neck, and getting his nose towards his chest, and thereby flexing neck and materially adding to his power of resistance. It may so happen that hobbles are not provided, or that the colt turns out so wild and unruly that they cannot be put on: in such a case as this what is to be done? A rope about thirty yards in length and two or three inches in diameter, will serve as an excellent substitute: a cart-rope will answer, and one can generally be obtained. Let this be equally doubled, and formed at the folded end, by a knot, into a loop sufficiently large to admit the head and neck, and hang upon the shoulders, the same as a harness-

¹ See the account of "Hobbles" of different kinds, in the *first* volume of 'Hippopathology.'

collar, with the knot turned downwards. The two ends of the rope coming from the knot in front of the breast, are now to be carried backward between the fore legs, and brought round the hollows of the heels of the hind legs, forward again, on the outer sides, in order to be run through the collar-rope, from which being carried again backwards, and extended in a direct line behind the animal, they are ready to serve, on the application of force, as a double-pulley, operating in drawing the hind feet forward close against the elbows: thus at once casting the animal, and securing him, when down, in a position highly advantageous to the operator.¹ One man will be required—two answer better—for each rope, who should be stationed directly *behind* the colt, and as near as they durst approach to his quarters, it being impossible now for him to kick. Just before the pull be made, it is a good preparation to falling (if we can or durst venture to do it) to advance his hind feet by lifting them forwards under his body; and, as soon as the time arrives, to make the pull, the men ought to exert themselves *all at once*, and no less forcibly and simultaneously than *suddenly*, it being desirable to take the animal off his legs by surprise—before he receives that warning of what is about to be done to him that sets him struggling and resisting. The moment he is cast, the man at his head must with his knee confine him down in the manner before mentioned, while the pullers are still steadily continuing to draw the hind legs forward. The hind feet being drawn close up to the elbows, the force must be steadily maintained, until each rope, by half-hitches, be made twice more to encircle the fetlock: one rope may then be carried backward, and the other forward; each being firmly held, in a state of extension, by an assistant. The colt thus secured may be turned upon his back, and bolstered up in that position by bundles of straw, or be

¹ Mr. Read, V.S., Buntingford, in a letter, in vol. xvii, p. 423, of the 'Veterinarian,' suggests that, "after having formed the middle of the rope into a collar, to place the knot *on the top of the withers*, and the two ends backward around the heels of the hind legs, instead of placing the knot on the breast; this would be found an improvement."

maintained reclining upon his side, at the pleasure of the operator ; who, so long as he is kept thus secured, will in any situation find himself in perfect safety.

CLEANSING AND LUBRICATING THE GENITALS is a preparative adopted by most gelders and farriers. It may be observed, in regard to it, that, to drawing the penis, and sponging and cleansing it, and the sheath, with tepid water, wiping them dry with a linen cloth, and afterwards smearing them both with lard, there cannot be any objection ; nor, unless the parts really be foul, will, I think, any material advantage be found to result from it.

CASTRATION BY CAUTERIZATION is the operation generally practised in our own country ; though one which the veterinarians of France, D'Arboval informs us, have abandoned for these sixty years past : the operation being there in the hands of gelders only, whose knowledge is traditional. It is by us performed as follows :—The instruments, &c. required are, a sharp scalpel of large size ; a pair of steel clams, slightly curved ; two budding or common firing irons, the latter with straight edges, to be made red-hot ; a sponge, and pailful of water. The operation is commenced by imprisoning between both hands the testicle lying uppermost, and then grasping and holding it fast with the right hand, while the left is slid round in front of it to obtain firm hold of the cord, above the epididymis, which enables the operator to carry the testicle backward and upward, and, by so doing, to render the skin over it smooth and tense. The *raphe* must be his guide in regard to the skin being drawn into its proper relative situation, as well as for his first incision, which is to be made in a line parallel with it, and at the distance of about a finger's breadth from the side of it. Should the action of the cremaster oppose the operator getting complete possession of the testicle, a sudden thwack upon the body of the horse or violent shake of his head, taking him by surprise, will generally occasion a momentary relaxation, of which the operator must not fail to take advantage. With the scalpel in his right hand, now at liberty, the operator draws a fine inci-

sion along the inferior (*upper*) border or long axis of the testicle, sufficiently deep only to divide the skin—which is here remarkably thin—but of sufficient extent to reach from one extremity of the gland to the other. This he follows up by dividing, with a light hand, in like manner, the cellular and fibrous substance underneath; and lastly, by similarly cutting through, in a more cautious way still, so as not to wound the testicle uprising (from the compression of the hand grasping it) all the while against the knife, its immediate covering, the tunica vaginalis: in doing which, we should not carry the incision further than is absolutely necessary to make an aperture large enough for the emission of the testicle. Some persons use the actual cautery, instead of the knife, for the section of the envelopes, assigning, as their reason for so doing, that not only is any hemorrhage which is likely to annoy them thereby suppressed, but that subsequent union by the first intention is thereby effectually destroyed. The French employ a bistoury for the same purpose; a practice, I think, as far as the vaginal tunic is concerned, which may be worthy our imitation, from its guarding against all possibility of wounding the substance of the testicle. No sooner is its vaginal tunic sufficiently incised than the testicle starts from its case, humid and shining upon its surface, and arborescently and beautifully venous: an event almost constantly announced by a violent struggle, during which the cremaster exerts such astonishing power that, unless we quickly seize the spermatic cord with our left hand and firmly maintain our hold, the testicle will be sure to escape and slip up into its canal. Should one testis be comparatively small—which is now and then the case—it may even be drawn up through the ring, and occasion the operator considerable difficulty in finding and securing it afresh, as well as delay in the operation. The subsidence of the struggle will be attended by relaxation of the cremaster, the effect of which will be, to allow of the elongation of the cord, and consequent complete possession by the operator and control of the testicle. This is the time to put on the clams. Prior to closing them, however, for

compression, it is good practice to divide the vas deferens with the scalpel, so as to liberate it from their grasp; by which not only will the animal be afterwards spared unnecessary pain, but the operator be enabled more effectually to exert compression upon the blood-vessels. Before the clams be finally closed and locked, the operator must determine on the place of section, for cauterization of the cord. For this, no invariable rule can be given: if left too long, it may hang out of the wound after the operation, prevent union, and grow into *champignon*; if cut too short, and there should happen to be any secondary hemorrhage, it may become a difficult matter to recover it again. The natural length of the cord, though not the same in all subjects, may be estimated, and this the moment relaxation has taken place, must be his guide. Having in his eye marked the place of division, the clams are to be closed and compressed sufficiently to arrest the circulation of the blood, and, at the same time, to retain the cord between them without risk of its slipping through the moment the testicle comes to be seared off: they may be locked or not, as happens best to suit the convenience of the operator. The firing-iron being handed to him, the operator is to commence his cauterization through the posterior part of the cord, in the situation of the spermatic artery, at the distance of about three fourths of an inch from the surface of the clams; dividing the artery first with the edge of the cautery, and then searing its mouth with one corner of the thick side or *heel* of the firing-iron, while at its greatest heat.¹ The spermatic artery being once seared up, the remainder of the cord will simply require cutting through with the edge of the iron. Another mode of procedure—more surgical than this and one that is growing in estimation—is the division of the cord with the knife, and the

¹ This is the practice of the French gelders. They divide the cord with a bistoury, and then—instead of a firing-iron—apply a budding-iron to the mouths of the bleeding vessels only, but at a white-heat, so as to *carbonize* them: it appearing a matter of consequence, says D'Arboval, not to cauterize the tunica vaginalis.

subsequent application of a heated budding-iron to the mouth of the spermatic artery, the same as French gelders do, leaving untouched with the cautery every other part. It is imagined, by not cauterizing the vaginal tunics, we run less risk of peritoneal or dangerous inflammation afterwards¹. The testicle removed, and the hemorrhage stanchd, the clams may be dilated in that slow and cautious manner which affords no risk of the end of the cord escaping, and yet sufficiently mitigates compression, *pro tempore*, to ascertain if the mouth of the artery be really sealed up: should it not, a fresh heated iron had better be applied upon the bleeding spot. In some cases, the artery, corrugated by repeated cauterizations, becomes so shrunk and embedded in the surrounding substance that the cautery can no longer reach its naked orifice: when this happens, it is best to cut with the cautery or knife a slice off the cord, whereby a fresh surface will be obtained for renewed cauterization. As soon as all bleeding has ceased, before liberating the end of the cord from the clams, it is usual to sprinkle its seared surface with some powdered resin, and to melt this with the cautery so as to give it a sort of coating of cement, the more effectually, it is said, "to seal up the mouths of the blood-vessels." I very much doubt, however, that it can have upon the already constricted vessels any useful effect: indeed, the practice is apt rather to prove an additional source of irritation. Done or not done, as pleases the operator, he is now gradually and cautiously to dilate the clams, and admit of the escape of the cord into the scrotum. By a similar procedure, the other testicle is to be extracted. In the event of either of the cords bleeding anew after the parts are released, bowlfuls or bucketfuls of very cold water may be dashed upon the parts, and the animal still kept secured, and quite quiet for some minutes: should it continue in spite of remission, and appear to be arterial, it will be advisable—

¹ If the iron be not at a white heat it adheres to the eschar, and detaches it, so that the blood continues to flow; and even when it is applied at the proper heat, if it be allowed to remain too long, the same effect will follow. (Costello's Paper on 'Torsion.')

particularly in the case of an adult or aged horse—to try to recover the end of the cord, and submit it afresh to cauterization. In the event of hemorrhage after the colt has risen, it is the practice, in some parts of the country, among gelders, to whip the bleeding parts with a bunch of stinging-nettles.

The objections urged against cauterization are—1st, That it is apt to induce afterwards, violent inflammation and its consequences; 2dly, That there is risk of secondary hemorrhage at the period of separation of the eschar. The best replies to which objections are, that cauterization can be shown to be—in colts at least—as generally successful as any other of the methods of operating in practice; and that, as for *fatal* secondary hemorrhage, it is a thing un-heard of.

The after-treatment to be pursued must very much depend upon circumstances. Supposing the colt to be at grass at the time of being castrated, and the weather to be neither cold nor wet, and there be no flies abroad, he had better be turned out again after the operation: nothing farther in general being required than cleansing the parts now and then from any discharges; and taking care that the wounds be kept from healing by the first intention, by the introduction of the finger into them, should it be required, on the second or third day following the operation; else, when suppuration comes on, should the matter be pent up, abscess and a good deal of concomitant swelling will be the consequences. For a horse standing in a stable at the time of being cut, a loose box is the best situation after the operation. Even in this case, however, if the weather prove fine, and there happen to be a small paddock adjoining, allowing him to take his liberty, even from the day following the operation, will prove beneficial: for, with the view of promoting suppuration and discharge from the parts, and of so abating swelling, exercise is found to be of all things the most beneficial, of which no horse will take sufficient of himself in a box, while in a stall he can take none: it is therefore, under such circumstances, a good practice in general to have our patient led out in hand, at a lounging walk, twice or thrice in the course of the day.

A mash-diet ought to be enforced. And some simple enemata, which are safer than aperient medicine (should the bowels require softening) may be exhibited. Attention being paid, as in the case of the colt, to the wounds in the scrotum, and to cleanliness.

CASTRATION BY COMPRESSION was first introduced to the notice of veterinarians of this country by Mr. Goodwin, through a paper he read on the subject at the Veterinary Medical Society in 1828, which was afterwards published in 'THE VETERINARIAN.' It appears to be the most ancient of any of the different modes of operating; and is, according to D'Arboval, at the present time almost the only one in vogue in France. The rationale of it consists in devising means to squeeze the spermatic cord to that degree that all communication, vascular and nervous, become intercepted between the testicle below and the cord above the part compressed; the consequence of which, of course, is, the destruction of the vitality of the testicle, and, ultimately, its spontaneous separation from the body by the process of sloughing. The pressure may be made upon the cord either while *covered* by the tunica vaginalis, or after it has been *uncovered*, or deprived of that membrane. The instruments requisite for its performance are, a *scalpel* or *bistoury*; *two pairs of wooden clams*, each pair already fastened at one end; strong waxed *ligatures* to secure the other ends; and a *pair of pincers* for closing and holding the clams. The clams commonly made use of are nothing more than sections of old and seasoned elder-wood; though some have since been manufactured of box and lance-wood, which appear more conveniently shaped, though there is no great advantage in them over the others. The grooves in them are usually filled with a caustic paste: one composed of the bichloride of mercury or sulphate of copper, and flour and water, appears well suited for the purpose. I have on several occasions, however, omitted using any caustic whatever, imagining it could not exert any—or any actual—effect under the unremitting pressure of the clams; but I found I had not produced the same mortifying results on these occasions, and therefore I now always employ

caustic of some sort. I once introduced—so long ago as 1821—*potassa fusa* into the clams; but this proved too active, the testicles after a few hours dropping off into my hands; and besides, it proved objectionable on account of its propensity to liquefy and spread. Although no more than two pairs of clams are actually required, it is as well to have a third pair loaded, ready, in case of accident.

We will suppose the horse to have been prepared for the operation in the manner already prescribed for that of cauterization, and to be cast and bound upon his near side, likewise, as afore directed, and the operator to be ready with his instruments and apparatus, which had better be spread upon a board or tray, and handed to him according as required by his assistant. The incipient steps of the operation are also the same as those for cauterization, save that in this case the left or *undermost*¹ testicle is to be *first* operated on. After dividing the scrotum, whether he proceed or not to incise the tunica vaginalis, and lay bare the testicle, will depend upon which operation he is about to perform, the *covered* or the *uncovered*. Supposing it is to be the latter—the one commonly practised—the vaginal tunic is to be cut or slit open, the same as is done in the former operation. The operator grasps the bare testicle,² and then, drawing it out, maintains that steady extension of the cord which is requisite to enable his assistant to place the clams properly upon it; which done, he takes the clams in his (own) left hand,

¹ In the operations by cauterization, ligature, or torsion, it is desirable to remove the testicle lying *uppermost* first, in order that it may be out of the operator's way when he comes to extract the other stone: but should he be going to use the pressure clams, he will find it very inconvenient unless he operate first upon the testicle *underneath*.

² It often will happen in strong colts—always in old horses—that as soon as the bare testicle is grasped, retraction of the cord will instantly take place, and with such force, perhaps, as to require considerable strength and steadiness in the hand of the operator to maintain the testicle. He must, however, firmly and steadily do so, and maintain all his steadiness and firmness until he has tired out the resisting efforts of the cremaster; which sooner or later must ensue, and of which he will have notice given him by a violent struggle on the part of the animal. Then will the cord become all at once relaxed, and the testicle so much under his control, that he can easily now make the required elongation, to fix

and adjusts them upon the cord as high up or close to the belly as he possibly can: it being most desirable to fix them completely *above* the epididymis; since, should any portion of that body become included in the compression, not only will much additional pain result, but it will be very likely to be followed by *chamignon*. Care must also be taken, by keeping the cord spread out, that every part is uniformly subjected to pressure at the time that the assistant squeezes the ends together with the clam-pincers.¹ This done, the operator himself takes the pincers in his (right) hand—leaving now his hold of the testicle—and maintains them closed (locked, if he likes), while his assistant secures the clams with a waxed ligature. The other, or uppermost testicle and cord, are now dealt with after the same manner, and the operation is concluded. The common gelders in France are in the habit of cutting off the testicles after putting on the clams, leaving only sufficient of the epididymes remaining to prevent the cord from slipping through the clams; while those who practise this mode of castrating in our own country, leave the testicles on until the time arrive to remove the clams; which some do at the expiration of twenty-four, others of forty-eight hours: but D'Arboval recommends that the clams continue on until the testicles spontaneously slough away, which they will do about the fifth day afterwards. The removal of the testicles at the time of the operation,² or within one day afterwards, sometimes even after two have elapsed, is usually followed by hemorrhage, which, though it may be nowise dangerous, is liable to prove troublesome. Another objection to the early abscission of the testes is, that the cremaster, losing the counterpoise of their depen-

on the clams. Let the operator by no means take his scalpel, and attempt by cutting to relax the cord. I did this in Col. P—'s brown stallion, aged, and much regretted it afterwards, in consequence of the great length of cord afterwards manifested such as to require a second operation—one of ligature.

¹ The vas deferens is not to be divided, as is recommended to be done in the operation by cauterization. Of itself, the vascular portion of the cord is found incapable of supporting the weight of the pendent testicles.

² Should the testicles be cut off, the epididymes, I repeat, will be required to be left remaining, to serve as a stay against the too forcible contractions of the cremaster.

dence, draws the clams up so violently against the belly that irritation and swelling are likely to be the consequence. I have known this to happen while the testicles have been left hanging on, and I have been obliged on this account to cut them away, with the clams, twenty-four hours before the usual period of time. The only thing that can be urged, I think, against their remaining on until they come away spontaneously, is the protraction of a spectacle of which, from its being disagreeable to common observers, we are perhaps desirous in general to abridge the duration.

The "COVERED" OPERATION has always appeared to me to be more difficult of performance than the "uncovered" one: there is more trouble in getting on the clams, and a great deal more force required to close them; in consequence of which, I should imagine, the pain must be a great deal more; and this is one, we are told, from which tetanus has resulted. In a case where hernia was either present or suspected, certainly the covered mode ought to have the preference: added to which, its advocates tell us, it possesses the advantage of not exposing the abdominal cavity to the influx of air.

After the operation, if the weather be fine, and particularly should our patient be manifesting any uneasiness, walking exercise in hand for an hour will prove of service to him; and as soon as he is returned to his stable or box, he should be secured to the rack with one or two strong halter-ropes, so that he can nowise get his head to his flank and tear himself. Should he have a long tail, it had better be plaited and doubled up, to prevent him switching his genitals. In respect to exercise, according to D'Arboval, no harm can arise from giving it for some hours, weather permitting, immediately after the operation, and it ought to be repeated daily until suppuration be completely established; and afterwards too, with the precautions that, at this period, it be now limited and confined to the finest part of the day. Should there be more than ordinary tumefaction, fomentation and aperient medicine may be required. In a case where much constitutional irritation prevails, we

may bleed as well: nothing will sooner allay any cause we may have for alarm than abstraction of blood. While everything is going on well, nothing farther will be required beyond exercise, and keeping the parts clean by fomentation; with, perhaps, an occasional enema. In fine, he will require watching up to the tenth or twelfth day, after which the patient may be regarded as out of danger.

The REMOVAL OF THE CLAMS, unless tumefaction of the parts demand it earlier, had better be deferred until the second or third day, by which time the testicles, should they not already have been cut off, will be quite dead, and the cords, when they come to be cut through, will resemble so much dried bladder: if the clams be removed before the cords and testicles begin to assume the dried shrivelled aspect (which is evidence of their complete mortification), secondary hemorrhage is liable to ensue. In fact, the condition of the testicles must be our guide: in some cases twenty-four or forty-eight hours being sufficient; in others—from the compression probably being incomplete—double that time will be required. In all cases, they will need to remain on much longer after the covered than after the uncovered operation. In taking them off, there is a knack of procedure which it may be as well to follow. The horse being twitched, and his fore leg held up, the operator places himself by the side of the near quarter of the patient, and with his left hand grasps the tail, upon which he balances himself while he stoops to carry his right hand, with a knife in it, between the animal's thighs, behind, in order to rest his thumb upon the posterior ends of the clams, while with the knife, clenched between his fingers, he cuts through the ligature holding them together. This done, the knife is laid down and the clams forced apart with one or both hands; for sometimes, in consequence of their being clogged with adhesive matters that have run from the wound, there is difficulty in separating them. Afterwards, the parts had better be bathed with warm water, if it merely be for the sake of cleansing them.

CASTRATION BY LIGATURE has for many years been abandoned by the generality of practitioners. The late Pro-

fessor Coleman was in the habit of decrying it, on the score of its being occasionally followed by disastrous consequences : an opinion which subsequent experience appears to have strengthened, though there still exist practitioners who give the ligature the preference. The reason assigned, why an operation so well adapted for man that no other is ever thought of, should not be found to answer for horses, must be, the anatomical one, of their existing an open communication between the cavities of the scrotum and abdomen in the horse, but not in man : in the one instance, inflammation may be set up in the cord with comparative safety to what it can in the other ; there being danger of peritonitis so long as the communication remains open, but none after it is shut. That operation, therefore, which either admits of the scrotal wound closing at once, or else excites such a degree of inflammation, in the first instance, as glues up the abdominal ring, appears better adapted for the horse than one which, like that of ligature, is tardy in bringing on inflammation, and, after all, does so too feebly to produce the adhesive action necessary to seal up the cavity of the abdomen while the suppurative action is going on.

The **MODE OF OPERATING BY LIGATURE** is quite simple. The scrotum and coverings of the testicle may be divided with a scalpel, in the manner afore described. The testicle being denuded, is to be given to an assistant, who must make a full and firm grasp of it, in order to counteract the contractions of the cremaster, and stoutly maintain his hold until the operator has divided the vas deferens, which will render his task comparatively easy. The operator will now, with forceps and the point of his knife, or with scissors, expose the artery, which he will find serpentining along the posterior part of the cord. A ligature of strong silk is then introduced underneath it, by means of an aneurismal needle or eyed silver probe ; having tied which, he severs with his scalpel the cord below it, and the operation is ended. One end of the ligature may be cut off close to the knot ; the other is to be left hanging out of the wound, until the second or third day, after which it may be removed.

Mr. Thomson, V.S., Beith, in a letter to Mr. Dick, published in 'THE VETERINARIAN' for 1835, writes—"I have made many experiments as to the use of the ligature in the castration of colts and horses, and the removal of this ligature on the second or third day. However humane the plan may appear, there are serious objections to it. Suppuration, in the generality of cases, does not commence until the fifth day—rarely sooner, sometimes later. Inflammation of the scrotal portion of the peritoneum must extend more or less during that period, and its progress is not arrested until suppuration commences." "I have cut about ten colts; some did remarkably well, in others the swelling was very great before suppuration commenced. In one that died it was uncommonly extensive. Suppuration did not commence until the sixth day. The animal got better at the time the swelling subsided, but he died two months afterwards." "I will geld no more upon this principle (ligature) unless particularly requested to do so."

CASTRATION BY TORSION¹ remains to be considered: not in the barbarous manner in which, years ago, it used to be performed in this country and France, but in accordance with the new lights shed on the subject of *torsion* by Messrs. Amussat and Costello. It is known, well enough, that in young animals—even in the colt—the testicles may be torn out of the scrotum after being denuded, or may be detached by twisting round the cord until it breaks, and yet no dangerous hemorrhage ensue. As has been stated, Professor Coleman once saw the stones of an aged stallion torn out: one testicle was extracted without much hemorrhage, and, after the lapse of a few days, the other: had both been torn out at one operation the animal might—and would most probably—have bled to death. The operation of twisting

¹ I believe "twisting" the vessels, or "torsion," as it is called, is almost abandoned. It will answer now and then, in vessels that stand out, detached from the neighbouring tissues, such as the facial; but we cannot take hold of the majority of vessels, and it is not safe to trust to torsion in the larger ones. You had better put ligatures about them. (Liston's Lectures, in the 'Lancet,' June 1, 1844.)

the cord is performed by first laying the parts bare, and then taking firm hold of the upper part of the cord with the left hand, while the right is engaged in twisting off the testicle, by repeatedly turning it round between the finger and thumb. And this operation, coarse and unscientific as it is, does not appear to be a very painful one, nor, in young animals, to be succeeded, when the rupture takes place, by any alarming hemorrhage.

COSTELLO'S—or rather AMUSSAT'S—improvement upon this consists, in twisting the blood-vessels, the arteries, only. From reflecting upon the fact that contused and lacerated blood-vessels seldom emit blood, M. Amussat instituted some experiments, the object of which was to imitate these effects artificially; in the course of which, happening on one occasion to twist an artery, he was struck with the fact of its emitting no blood; thus accident led to a discovery which deductions from facts such as the foregoing might have anticipated. “In practising torsion, Amussat seizes the divided vessel with a pair of forceps, in such a manner as to hold and close the vessel within their teeth. The artery is then drawn from out of the tissues surrounding it, to the extent of a few lines, and freed with another forceps from its cellular envelope, so as to lay bare its external coat. The index-finger and thumb of the left hand are then applied above the forceps, in order to press back the blood contained in the vessel. He then begins to twist the artery. One of the methods consists in continuing the torsion until the part held in the forceps is detached. When, however, the operator does not intend to produce this effect, he ceases after from four to six revolutions of the vessel on its axis for the small arteries, and from eight to twelve for the large ones. The hemorrhage instantly stops.”—“It is of the utmost importance to seize the artery perfectly, and to make the stated number of twists; otherwise, the security against the danger of consecutive hemorrhage will not be so perfect.” M. Amussat is so satisfied with torsion, that he now employs no other hæmostatic agent. He has found it successful in castration, amputations of the thigh and arm,

and in disarticulation of the shoulder-joint. The effects of torsion upon the vessel are—the internal membrane is broken, and becomes rolled up in the form of a *cul-de-sac*, containing in its middle a clot of blood, to which it afterwards adheres, through the effusion of plastic lymph. In no instance has the artery been observed to ulcerate or become gangrenous.

To Mr. Molyneux, V.S., London, belongs the credit of being the first to introduce torsion as a mode of castration of horses. In 'THE VETERINARIAN' for 1835, appears the following :

In November, 1834, Mr. Molyneux was requested by Mr. Geale, job-master, Regent Street, to castrate a colt. Torsion was suggested and consented to. The colt was cast and secured in the usual mode. Mr. Molyneux laid bare the testicle in the ordinary manner; and first divided the vas deferens and cellular membrane, immediately above the epididymis, leaving nothing attached to the testicle but the spermatic artery and vein. "I then took the torsion-forceps and applied them as tight as possible, after the clams had been placed on the cord about three inches from the epididymis in the usual manner, and the testicle cut off. The forceps were turned eight or nine times, and held firmly for four or five minutes, when the cord was suffered to return gradually into the abdomen. I waited five minutes, and, no hemorrhage ensuing, I operated in the same manner on the left testicle. The colt was then let up, and only the trifling quantity of blood which is usually discharged by the scrotal vessels, was lost." Annexed to this—the first case—are accounts of two others, one of the horses being five and a half years old, both equally successful in their results.

By way of caution, Mr. Molyneux adds, that the operator ought to make the requisite number of torsions steadily and without stopping, and "hold the cord, firmly, for two or three minutes afterwards." According to Amussat and Costello, however, this last injunction is unnecessary. "If, after a certain number of turns, the operator pauses, and then, fearing he may not have done enough, gives another turn, and,

after that, perhaps another, the coagulum or clot is disturbed or broken, and hemorrhage will possibly follow." In the short lapse of time in which Amussat and Costello, continuously, seize, twist, and replace the vessel, it is impossible coagulation of its blood can take place.

Mr. Richardson is the next to adventure in this bold but commendable line of practice. Confessing himself "among the number who entertained doubts respecting the efficacy of torsion in the horse;" he, now that he has tested it, "does not hesitate to express his firm conviction that this will be the only method, in after-days, resorted to by veterinarians for the removal of the testicles."

Mr. Richardson made his first essay on an ass. The result exceeded his most sanguine expectations. He afterwards operated on three colts; and "never saw colts do so well as they did afterwards." Being at grass, the colts were in the morning taken into the crewyard, and kept without food until the afternoon. They were then cut, and "immediately allowed to go at large again in the fields." ('VETERINARIAN' for 1835.)

To Messrs. Simonds and Daws are the profession indebted for most valuable and confirmatory information on this subject, published in 'THE VETERINARIAN' for 1840.

Mr. Simonds has drawn up a "report" of nine cases.—CASE I, was a four-year old donkey. The testicle was let out with a scalpel, the finger passed between the vas deferens and vascular part of the cord, and the latter divided, which gave the operator full control over the cremaster. The spermatic artery was now laid bare, about an inch above its testicle, and was then seized with the torsion-forceps, and, lastly, divided immediately behind the forceps. The artery was drawn gently out, and about a dozen twists given to it. It was then liberated. No blood escaped for a few seconds; but afterwards the jet was so considerable that Mr. Simonds was obliged to seize it anew, and make fresh twists. This effectually stanching the hemorrhage, and the testicle was cut away. The other testicle was similarly extracted; and the animal let up. A quarter of an hour after, Mr. Simonds found the right spermatic artery bleeding—arising from his not being *au fait* at manipulating his forceps. The ass was re-cast, and the vessel tied. Some swelling followed; but the ass eventually did well.

CASES II, III, IV, and V, similarly operated on, all did well.

CASE VI.—A four-year-old donkey bled, after rising. But, as the hemorrhage appeared to come from the artery of the cord, nothing was done. It stopped, and he in the end did well.

CASE VII.—A thorough-bred yearling. Testicles small, and not completely down. The cord so short that great difficulty was experienced in applying the forceps. With the left cord Mr. Simonds succeeded, and by a few turns prevented bleeding; but with the right he was compelled to have recourse to the actual cautery. This shows we cannot always succeed by torsion.

CASE VIII.—A valuable chestnut horse, seven years old. The left cord was considerably enlarged, and serous effusion had taken place into its tissue. The artery, about two inches above the gland, was found to divide into three branches. By proceeding cautiously, these were in turns seized and twisted with the forceps. The artery of the cord gave out a fine stream; but, as Mr. Simonds has seldom attended to this, the animal was, notwithstanding, let up without any attempt to arrest it. The bleeding continued for two hours, and the scrotum on that side was filled with coagulated blood, producing some pain, accompanied by an accelerated pulse and hurried breathing. An opiate was given. This shortly produced relief, and all went on well. The coagulum was removed on the following day, and the parts fomented. More swelling took place in this than in any preceding case; still it yielded to fomentation and exercise.

CASE IX.—A two-year-old, the property of the Queen Dowager. The left testicle was double the size of the other, and the artery of the cord was very large. Having had some reason to regret not having applied torsion to this vessel in CASE VIII, in the present one Mr. Simonds twisted it. Very slight preputial swelling ensued, and the case was discharged the day after operating.

Mr. Daws, in 1838, by way of experiment, cut an aged stallion by torsion, who died the following morning from hemorrhage of the right cord. On examination of the parts, the left spermatic artery was found perfectly plugged: the right had recoiled and untwisted itself. Its mouth was open and free from blood. The same year Mr. Daws operated on another subject, more than twenty years of age, who had covered a short period before the operation. Being bought for the experiment, he was destroyed four days after the operation. Clots at the divided ends of the vessel had rendered them completely impervious. Their inner tunics were torn and adherent. There was a slight appearance of healthy purulent secretion on some spots. The following year Mr. Daws operated on three colts. No constitutional excitement supervened, and tumefaction of the sheath resulted. Mr. Daws's words are—"These results exceeded my expectations."

In conclusion, let me mention, that Mr. Wardle, V.S., East Sheen, in 1838, operated by torsion on sixteen colts, all of whom have done well. His own conviction is, that he "shall never again use the actual cautery."

These accounts of *torsion* are flattering indeed. He must be at least a more than ordinary sceptic who will not, after perusing them, be induced to put the new remedy to the test, and judge for himself. There appears to be little or no apprehension entertainable about secondary hemorrhage in colts; but that such may ensue, and prove fatal, in aged stone-horses, is sufficiently manifest from one of Mr. Daw's cases; and should such an event happen to a veterinary surgeon in private practice it might be enough to blast his reputation,¹ in addition to the disrepute into which it could not fail to bring the operation itself. In the army, cases of castration are so few that I have not yet myself² had an opportunity of practising torsion:³ when I have, I think I shall, by way of precaution, run, with a needle, single but strong threads through the cords, and leave them hanging for some distance out of the wounds, with a view of enabling me to recover the cord, should secondary hemorrhage come on; otherwise, they might readily be withdrawn on the next day. Such a simple addition as this could not irritate, and yet might, it strikes me, prove of very great service. I may now add to the above account, in spite of the favorable aspect altogether put on by it, that torsion has not made way with us. The reason appears to be, that in castration we cannot endure the thought of risk of any sort, however small it may be represented to be.

¹ "Among the numerous difficulties which the country veterinarian has to encounter, there are none that hurt his character or blast his reputation more than a case of unsuccessful gelding." So, truly, writes Mr. Thomson, of Beith.

² Widely different, this, from the French service. M. Texier, V.S. in the French cavalry, says, "From the beginning of December, 1830 to April, 1831, I received for my regiment at Erreux about 2900 horses, 2000 of which were castrated, but by a gelder provided by the contractors."

³ Since this was written I have experimented on an ass with success.

CASTRATION BY SCRAPING.—Mr. Hurford, V.S., 12th Royal Lancers, now at Bangalore, Madras, in answer to the question, “Which is the best mode of castration?” says, “I have tried the actual cautery, the clams, the ligature, and scraping, and I prefer the last; it being simple, safe, and speedy.” To perform it—“You begin as for castration in the ordinary way. Free the testicle, and grasp it with the left hand; *divide* the *seminal* part of the cord, and, with a rough-edged knife *scrape* the *vascular* cord lengthways, until you scrape through it. Simple enough, and speedy too, since from first cut to last scrape takes rather less than twenty seconds. I have done it in sixteen, and safely, for I never knew a horse bleed more than I wanted, and you have a simple wound without any foreign substances to deal with. The horses stand quiet for three days, being merely rubbed down. On the third day, the coagulum is washed away, and the parts cleansed, and nothing more is required after than to continue to keep them clean. Tetanus is *not* a frequent sequel to castration; though I saw last month you had put a (?) after what I wrote: as to the time most likely for an attack, I have always found it to come on just as the wound had healed, no matter in *what* part of the body it may be. Those attacks arising from castration, generally manifest themselves from the fifteenth to the twentieth day; but I have seen them both earlier and later. As a rule, I do not castrate during the hot months, nor during the heavy rains. Wounds and ulcers generally take on an unhealthy action at those seasons, and particularly during rains. But I have operated in every month of the year.”

In the year 1848, Mr. Broderick, V.S., 4th Madras Light Cavalry, sent to the “VETERINARIAN” (vol. xxi, p. 607) an account of this operation, practised as follows:—“After securing the horse, cutting through the scrotum, and drawing out the testicle, uncovered, in the usual way, divide the vas deferens pretty high up; take hold then of the vascular part of the cord, with testicle attached, and spread it out between the thumbs and fore fingers; by so doing, the spermatic artery is somewhat elevated; now press the finger

through the fascia, immediately underneath the artery, and divide all below with a scalpel, leaving little or nothing but the artery remaining: afterwards take hold of the testicle, and with a large knife, with a slightly roughened edge (common post-mortem or table knife), scrape through the artery, turning the edge of the knife (as the horse lies) downwards, and slightly inclined towards the belly. The movement of the knife must be rapid, and about four backward and forward motions will do. Give then a dash of cold water, and lead the horse to a stall well littered. Sometimes a few drops of blood fall for about half an hour, seldom longer. Keep the animal quiet; give him his grass or hay, and half a feed of corn; maintain him standing the first day, but let him lie down the next; exercise half an hour morning and evening; gradually increase feed and exercise.

“ A system somewhat similar was introduced by Mr. Jennings, late V.S. of Artillery, who, whilst at the Cape on leave, saw it performed on colts by a farmer. But the manner in which he saw it done, and afterwards practised it, was scraping through the whole cord: this, I need not say, is a disgusting and fearfully tiresome operation, especially in old horses; for when you get half-way through the cord you cut a little, and just in the wrong place, it being impossible to see the artery, and then you have the blood spirting in your eyes the remainder of the time. Mr. Western, V.S. of the Body Guard, was of the same opinion as myself. I was, nevertheless, struck by the manner in which those horses I operated upon recovered, showing little or no pain, leaving the ‘sick lines’ cured, and in as good condition as when they entered; so I tried it on my present plan, and with complete success. The operation takes me from one minute to one and a half, from the time I make the first incision to the horse being on his legs again. Of course, with adhesion of the vaginal covering it takes longer. I have castrated on my new plan 270 horses in my own regiment, about fifteen daily, and every horse has done well. Ten by caustic clams; two by firing (one died); two by

ligature (one died) ; and six by torsion, altogether 290 ; and besides my own regiment about twenty in the Artillery, on my 'scraping method,' and every case successful. Messrs. Crundall, Crowley, and Field (gentlemen who have been doing duty with me) can all perform the operation equally as well as myself, and are delighted with its simplicity and cleanliness ; for you need hardly soil your fingers. I think gelding must be a safer business in India than at home ; for our old horses do quite as well as the young. I have cut some eighteen years of age, thirteen of which have been passed in hard regimental duty. Of the 300 above alluded to, most were aged : thirty-six averaged sixteen years, and all of these did well. It may be in place here to say, that in one or two cases the dropping of blood increased, and I found it necessary to introduce small pieces of tow up the scrotum as the horse stood. I fear you will consider me too prolix, and somewhat egotistical, when I tell you, that I have been honoured with the approbation of the Commander-in-Chief, for—to use his Excellency's language—'the ability and care evinced in carrying out the important duty that devolved upon me.' This is flattering ; but I attribute my success entirely to the system I adopted ; and feel convinced, taking into consideration the age of my patients, heat of climate, and many other circumstances, that the old plan would, in numerous instances, have been attended with fatal results."

ANORMAL APPEARANCES DURING CASTRATION now and then, not often, present themselves. When they do, it is generally in adult or old subjects, and in such as have been in training, or have raced or hunted. Against them the castrator must be prepared to act at the moment of their occurrence, there being little time then for consideration, and no excuse for being—what he never ought to be—taken by surprise. The first unusual appearance—and very unusual, unless in aged stone-horses, I believe it to be—is, *adhesion' between the vaginal and albugineous tunics*, the common situation for which is the infero-posterior part of the testicle. Should the adhesion be recent, the tunics will

admit of separation either with the finger or the handle of the scalpel; an old and firm one may require cutting. This will but somewhat protract the operation—in nowise alter it. The worst accident likely to befall the operator is—

HERNIA; and this, should he have done his duty in examining the animal beforehand, may generally be guarded against, *i. e.* by modifying the operation and using every precaution during its performance; or not encountered. Commenting practically on this passage, Mr. Hurford, V.S., 12th Dragoons, Madras, writes to me, in the "VETERINARIAN," vol. xxv, p. 242—"I confess I do not understand how, and should be very glad to be informed. I have operated on a great number of horses, and I know of no way of preventing hernia. I have also castrated horses that I know have been ruptured, several times; and though I would rather not have done it, I was obliged to go on. Nevertheless, no untoward symptoms manifested themselves; while with others in perfect health I have had hernia. Pray notice this, such paragraph in your book, with the authority of your name, might lead non-professional people to blame the operator, though no blame really attached to him:" *i. e.* by refusing to undertake an operation, under such circumstances, at all. It is very often of little use in some of these unwelcome cases to represent the risk and danger attendant on castration. the owner perhaps will have it performed. In this case, the operation, of all others, especially adapted for the case, is the "covered" one, with pressure-clamps. Should hernia, not pre-existent, unexpectedly come on during the operation, the pressure-clamps must still be resorted to as the most effectual means of preventing protrusion; and in such a case, the longer they are kept on the better. In a case of actual protrusion of bowels, the introduction of one hand into the rectum, for the purpose of withdrawing them, while the other is employed at the scrotum, will be found the readiest mode of returning them. Should intestines be inflated, and thereby augmented in volume, it may be necessary to puncture them in places; at the same time any requisite dilatation is to be made at the abdominal ring, as

in case of strangulated hernia, which in fact the case has now become. Should a portion of omentum protrude, and be not easily returnable, it had better be cut off.¹

THE CONSEQUENCES OF CASTRATION are either *normal* or *abnormal*. The former comprise *pain, inflammation, and its sequels, tumour, suppuration* : the latter, *hemorrhage, hernia, peritonitis and enteritis, champignon and scirrhus, gangrene, tetanus and palsy, amaurosis, strangles, farcy and glanders*.

The NORMAL OR NATURAL CONSEQUENCES are, expression of pain, more or less violent, which gradually subsides in the course of a few hours after the operation ; and tumour of the parts, appearing about the second day, greatest in the anterior or most dependent portion of the sheath, and, according to D'Arboval, greater in colts than adult horses. Even though the swelling be considerable, still so long as it is confined to this part, and is evidently "dropping," it need excite no alarm. It is only when the tumour occupies the circumference of the wounds, acquires a globular and tense and shining aspect, extends underneath the belly, and occasions evident stiffness and dragging of the hind quarters, that it will become necessary to pay especial attention to it ; not so much on account of its liability to augment outwardly, and occasion (as it sometimes does) a sort of phymosis and difficulty of staling, as from its inwardly extending up the cord, and ending we know hardly where or in what. A full bloodletting is of all others the best counter-active of such extension. Frequent walking exercise likewise contributes much to the dispersion of the swelling. Fomentation may occupy the intervals. And let copious enemata supply the place of a cathartic ; though, should that appear requisite, I would give it, notwithstanding certain alleged objections, without hesitation. When tumour and tension is excessive, scarifications will often afford great relief : should the consequent issue be reddish, filamentous, and serous, D'Arboval says, it is ominous of a tendency to peritonitis and gangrene,

¹ For further information on this subject turn back to the account of the operation for the "Hernia of Castration," at p. 390.

and this danger is much enhanced by the concomitant engorgement of one or both cords.

SUPPURATION, in reference to the operation by pressure-clams, according to the same accurate observer, is announced by some fulness of the lips of the wounds, accompanied by febrile disorder, commencing on the second or third day, reaching its height on the fourth, and continuing until the suppurative process is completely established. At first a yellow serous issue is observed, which afterwards turns white, and at last assumes all the characters of pus. This laudable secretion, though its course may be interrupted by a variety of circumstances, continues augmenting up to the tenth or twelfth day, after which it slowly or quickly diminishes, sometimes not ceasing before the twenty-fourth or thirtieth day. So that often at the end of a month cicatrization is not complete, there still remaining some discharge.

The following are the observations of the late Mr. John Field, in regard to suppuration.

"A grey horse castrated (with the clams) 23d October, 1826, had no regular purulent discharge, until the 29th; only a serous exudation existing previously to that.

"A black colt castrated with sticks (clams) 19th October, and, fourteen hours after, the sticks were removed. Three hours after this, pulse 42. 27th October, we first noticed *purulent* discharge. Particular attention was paid to discover at what period this took place.

"18th October, 1826.—The hair was shorn off a place in the skin, by the side of the right nasal bone. Caustic potash was rubbed in partly through the skin. 30th October, first commenced separating at the lowest part."

THE ABNORMAL OR INAUSPICIOUS CONSEQUENCES of castration include one which is hardly ever noticed, or perhaps little thought of, viz. the admission of *air into the abdomen*: one very properly mentioned by D'Arboval as liable to occur in every operation save the "covered" one, and often, as he says, demonstrable at the time, by the gurgling in the sheath audible on inspiration and expiration. Its presence has never appeared to do harm.

HEMORRHAGE, either unavoidable or from mismanagement, may occur after any of the operations; though it rarely does to an amount to excite apprehension; and when alarm has arisen, there are still so many chances in favour of its stopping that we need be in no hurry about recasting the horse, or taking any desperate measures. Bleeding from a single spermatic artery—and it is not likely blood is flowing from both—though left without any measures whatever being taken to staunch the hemorrhage, is exceeding unlikely to proceed to any dangerous length. Professor Coleman's experiment warrants this assertion. To be sure, his case was one of *arrachement*; but then it was that of an *old stallion*: a young one would have had a still better chance of surviving.

LAFOSSE could not conceive why people took so much pains about castration. He assures us he has cut many horses without either cautery or ligature, and they perfectly recovered: it is true, a good deal of hemorrhage followed, but this was in no case mortal, at least that he heard of. Matheron excised both the testicles of a glandered horse. The animal bled copiously for four hours, when he fell from weakness, and sank into a state of stupor; in which he lay six hours, and then recovered sufficiently to eat. On the fifth day after, he was destroyed, being in a fair way of recovery. Mathia performed the same experiment at Turin, in presence of Toffia, and the horse recovered. Excision of the testicles of a young vigorous horse, whose value was guaranteed, was also exhibited at the Alfort School, in the presence of the Professors Gilbert and Barruel; an account of which will be found in the Report of the Public Session held at the School on 12th Nov. 1815. In several countries in Europe castration is accomplished simply by laying open the scrotum and tearing out the testicles: the spermatic vessels are left unsecured and unsealed, and yet there is no dangerous hemorrhage; but the acute pains which laceration of the nerves occasion even produce so much inflammation and engorgement that it would be better to *cut* than to *tear* the cord.—Barthelemy, desirous of setting the question beyond the pale of doubt, cut *both* spermatic cords, just above the epididymes, in five horses intended for dissection. One had risen a quarter of an hour before bleeding commenced. Another lost nearly a quart of blood. A third lost but a few ounces. It was observed that the hemorrhage continued longest in those that were weakest. Gohier has likewise made some similar experiments not on horses only, but on other animals, from which he has drawn three conclusions:—1st, That the castration of solipedes by simple excision of the

spermatic cords is not always a proceeding unattended with danger, some having lost within the space of a few hours as much as from two to four gallons of blood. 2dly, That such a procedure appeared less perilous in dogs. 3dly, That in small dogs, cats, young boars, lambs, and goats, the hemorrhage was of hardly any amount.

If the improbability of the animal bleeding to death be great even when simple excision is practised and no means are taken to seal or secure the vessels, how much greater must this be when but partial hemorrhage ensues from one or other of these styptic measures having failed! I never heard of a horse bleeding to death after castration by cauterization; and after the use of pressure-clams, providing the clams be not removed, or the horse do not tear them off, before the testicles slough away, or they be not taken off in a manner to lacerate or unglue the sealed extremity of the cord, there can be none. In case there should be any small stream of hemorrhage after the removal of the clams, it is in general very easy to catch the bleeding orifice with forceps or tenaculum, and pass a simple ligature around it; or, if it be difficult to do this, or there be two or three places bleeding, the clams may be put on again. There is no difficulty so long as the end of the cord is visible; it is when the bleeding cord has been shortened by excision or cauterization, or by the clams being torn off to that degree that it subsequently becomes retracted and drawn up into the vaginal sheath, that the case turns out embarrassing. In this predicament, the promptest and simplest remedy we can adopt is dashing buckets of ice-cold water upon the sheath; the surest, getting hold, if possible, of the end of the cord with a pair of long and bowed forceps, and drawing it down, and putting a ligature around it, or applying the cautery to it: not being likely, however, to effect this, unless the horse be cast—which may or may not be advisable or convenient—should the cold affusion fail, we may try if we can plug the bleeding side of the scrotum with tow dipped in a solution of alum, and made up into hard pellets. Even this, however, according to D'Arboval, may prove objectionable, from the blood having been known to ascend and enter

the abdomen: thus, perhaps, occasioning death in another way.

Hernia rarely occurs *after* castration: indeed, when the pressure-clams have been properly applied, it is almost impossible for it to happen. Should any bowel protrude, it will become necessary to cast the horse again, in order that it may be completely returned, and effectual measures taken to prevent return, and ensure its permanent reduction. Where no pressure-clams have been or can be used, the best—indeed the only—means of security we possess against relapsed protrusion, consist in stitching up the scrotum; for which the quill-suture will be found the strongest and most durable.¹

CASES OF DESCENT OF BOWEL AFTER CASTRATION do, on occasions, occur, and in some instances, such is the restorative power in the young animal, occur with impunity, as the following case shows:

“A few weeks since I was sent for in great haste a distance of about three miles to see a well-bred two-year-old colt that had that afternoon been castrated. After the operation, when the animal began to walk, the castrator observed an enlargement in the scrotum, which in a few minutes proved to be the intestine. It began to increase, and descended nearly to the hock. I was immediately sent for, and by the time I arrived the castrator had the colt again cast, replaced the intestines, and put three stitches of small twine in the abdominal ring through and across; also three more stitches through the upper part of the scrotum, as close to the ring as possible. The stitches appeared to be well placed in the ring, and I did not consider it necessary to make any alteration: had I been there a few minutes earlier, I should have used the metallic wire, instead of the twine. The colt did well, without any further treatment more than a little physic and a restricted diet.

This person informed me that he had operated on more than 3000 colts, but never had such a case before. The omentum he frequently found in the scrotum: that he never hesitates to take off, even to the extent of a yard.”

PERITONITIS is a serious and sad consequence of the operation, and one that may show itself at any period, even during

¹ For further information on the subject of this hernia, turn back to p. 390.

convalescence, at the same time, one which, but too commonly; by rapid strides, in spite of all that can be done, ends in mortification and death. Inflammation aggravated or protracted in the scrotal wounds from some source of irritation, will readily find its way into the abdomen; though this probably is not so frequent a cause as catching cold or exposure to cold: turning a colt out after being operated on during cold damp weather, or into wet marshy pasture, and particularly at the fall of the year or in winter, is certainly hazarding an attack of peritonitis. It was observed at the Veterinary School at Lyons, during the sessional year 1817-18, that the inclement weather which prevailed proved the occasion of several horses being suddenly seized with peritonitis after castration, and of some dying from it in spite of all that could be done. Dulness and dejection; loss of appetite; a tucked-up and tense abdomen; disturbance of respiration and pulse, ending in the manifestation of abdominal pain; will denote its attack, and immediately set us about the employment of appropriate remedies.

ENTERITIS, according to D'Arboval, may prove a complication of peritonitis, and render the case so much the more dangerous. This is more likely to happen when the horse has not received the preparation of fasting for the operation, or has taken cold after it. It is indicated by the presence of the most violent griping pains. Should peritonitis not be already present, these fits of colic may bring it on. It must be treated accordingly.¹

CHAMPIGNON—for which we have not yet got an English name—is one of the occasional consequences after castration of the pressure-clams: in no case, that I am aware of, has it supervened upon cauterization; hence the little we as yet know about it in this country compared with the knowledge which the experience of years has put French veterinarians into the possession of concerning it. D'Arboval's definition of it, is, a fungous enlargement of a scirrhus nature of the lower extremities of the spermatic cord; and the account he

¹ For an account of the symptoms and treatment turn back to "Peritonitis" and "Enteritis."

gives of it is as follows: So long as the disease is confined to the extreme end of the cord, it retains the appellation of *champignon*; when a sarcomatous change comes to affect the entire cord as high as, or even beyond, the abdominal ring, it then takes the name of *scirrhous of the cord*. Champignon oftener appears on the *left* than on the right side: not owing to any particularity of structure, but simply, apparently, to the greater difficulty of placing the clamps upon the left cord, owing to the right testicle being in the operator's way. One is apt not to be able to get the clamps so high up or so completely closed, and thus a portion of the epididymis is very apt to become included, a circumstance which is the usual cause of champignon. In some of these cases the swelling runs up the cord, reaching even to the loins, and becomes a source of great pain. The cord contracts adhesions with the surrounding parts, and sometimes itself turns to a cancerous mass. Now and then, in the first instance, the scrotum partakes of the scirrhous tumefaction: but this gradually subsides—seldom any cicatrization or adhesion of it taking place. In general the aperture remains open and discharging, and the end of the cord, hanging loose within it, continues ascending and descending according to the action of the cremaster. Champignons vary in their size and form: sometimes their largest part is below, sometimes above. Soon after the commencement of this disease, commonly between the sixth and tenth day, the horse manifests stiffness in moving the limb of the affected side. This dragging of one or both hind legs is evident on his first leaving his box or stable: should it not diminish or disappear from exercise, but, on the contrary, continue or become worse after it, we have good reason to suspect champignon; for, as for the stiffness arising from the operation itself, that is dispersed by exercise. In proportion as the swelling of the cord augments, the difficulty of progression increases, both the croup and loins manifesting it in their movements: the horse also on occasions draws up his leg while standing, becomes dull, tucked up, and falls away. When the tumefaction of the cord is excessive, the animal

halts upon the affected side, and at times the limb becomes swollen all the way down; and, should both cords be diseased, the movement of *both* hind limbs becomes painful: the patient no longer lying down, but continuing to be preyed upon by an exhausting suppuration and fever, ending in marasm and death. The cord on dissection appears solid, thick, and scirrhus, and as large as a man's arm in volume, all the way from the wound to the loins, having vessels in it the size of one's finger, and divers abscesses full of black, sanious, fetid matter. The kidney, haunch, and thigh of the same side contain fistulous ulcerations; the bladder has the appearance of scirrhus: in fine, all the surrounding parts participating more or less in the general disorganization.

Scirrhus and champignon constitute a grave, often indeed a mortal, affection. Among the numerous and discernible causes for it, the principal are such as occasion inflammatory irritation. It is generally believed that placing the clams upon the epididymis, or not immediately above it, may produce the disease. Let not the fear of being able to accomplish the drawing down of the testicle induce us to place the clams *close* upon it, where the compression must necessarily be incomplete; on the other hand, let us not place the clams unreasonably high up, lest the cord become dragged by the expansion and pressure of the belly against it. Aged horses are more liable than colts to champignon; and stallions more than stone-horses who have never had mares. Lastly, champignon may result from the cord being diseased prior to operation.

TREATMENT OF CHAMPIGNON.—In robust and healthy subjects, champignon and scirrhus often become dissipated, in the course of time, by a continued profuse suppuration; in which case the swelling disappears in from six to twelve months. Fomentations, dressings, and exercise, promote this favorable termination. When there is no prospect of resolution in this manner, the operations of amputation and ligature are offered for our notice. It has been proposed to cut or burn off champignons while the cord continues in a swollen and painful condition; but from this, gangrene is

liable to result. Nevertheless, Gillet, Bezier, Robert, Poincelot, and Mathieu, have amputated tumours of great volume with success. In my opinion, amputation is only advisable when champignons are of small size, have narrow bases and lower surfaces spreading over the borders of the scrotal wound, with cords but little enlarged. For the operation, the horse is to be secured the same as for castration; the external wound is then to be dilated by incisions in front and behind; the base of the champignon to be isolated by dissection; and fluted clams, containing, if it be thought necessary, some bichloride of mercury, applied. On the second or third day the clams may be removed, and the champignon cut off, without fear of hemorrhage. In other cases ligature is to be preferred. Indeed, providing there be not evident objections to its use, it may be considered our general remedy. One would not think of applying ligature in a case where the spermatic cord was swollen the entire way up to the ring, or of carrying a ligature so high up as that, even supposing the swelling terminated there; and yet in such a case as this, unless the cord be divided at the ring, the disease is almost certain to return, and probably in a worse form. We must take care that our remedy prove not worse than the disease. Ligature, in point of fact, is applicable only in those cases in which it can be carried *above* the place of enlargement in the cord; and inapplicable in such as have the enlargement extending beyond the ring, too high to be surmounted by it, with enormous tumefaction upwards as well: here, ligature must necessarily include the scirrhus substance itself, the portion of which still remaining, above it, will rapidly augment and cause death. And when the base of the champignon has acquired a certain volume, the spermatic vessels are found to have become greatly enlarged also, rendering hemorrhage almost certain to happen, indeed almost inevitable.

Ligature, supposing it to be practicable and advisable, is still not to be employed until inflammation has been subdued, nor without some preparation of the patient. The horse being secured as for castration, an incision is to be made

across the middle of the lower surface of the tumour, from one extremity to the other, in such manner as to destroy, as much as possible, any surrounding adhesions the cord may have contracted, without risk of wounding its vessels. This will enable us to get at the neck of the tumour, around which is to be fastened our ligature, tight enough to interrupt the circulation. Over this is to be placed a second ligature, furnished with a slip-knot, with its end brought out of the external wound, and so adjusted that it may be tightened after suppuration has commenced. Some veterinarians who have been desirous to employ clamps in these cases, have had *curved* clamps made. Chabert directs us to have a leaden ring constructed for the cord, which can be contracted at pleasure. Mathieu uses a sort of pincers of his own invention, or else a ligature so disposed that it acts only upon the blood-vessels.

In the treatment of scirrhus, when once it has extended along the cord, as high, perhaps, as the loins, quite out of the reach of ligature—a fact that may be ascertained by manual examination *per rectum*—and the cord itself is found to be indurated, and increased in volume upwards, and has contracted adhesions with the surrounding parts, and is likely to degenerate into a cancerous mass, in its extent from the scrotum to the loins, other means must be sought. One resource is left us—that of piercing or boring the cord with a red-hot iron, of sufficient length and straightness, and about the diameter of the finger. The scirrhus cord is to be drawn forth, to the extent that it will bear, by an assistant, who at the same time diverges the lips of the wound, while the operator plunges the cautery into the scirrhus substance, and thrusts it longitudinally through it. At the same time he may, if he likes, cauterise its sides, both within and without the scrotum: the object being to induce a suppurative process which may in the end consume it. From time to time the eschars and concretions of matter will require removal, and the parts cleansing.

At the Toulouse Veterinary School, an enormous champignon, the consequence of castration, of about three months' standing, was cured

by caustic. The horse was in the state of exhaustion and marasm afore described. Ligature was attempted, but slipped off from not being got high enough. Several different times it was tried to plunge an iron, white-hot, into the cord, previously denuded of its softer parts by means of a section of elder-wood, which served as a director; but it destroyed only some softer portions, and there was apprehension of inflammation ensuing. Profiting by the cavity that had been made by the cautery, we introduced into it a piece of caustic potash, and confined it with a plug of tow; surrounding the cord with tow besides, to protect it against any caustic droppings, the tow being confined by sutures. The animal was kept upon his back for a quarter of an hour, which was deemed requisite to give the caustic time to combine with the tissues. Three days afterwards an abundant suppuration brought away the plugs of tow. Reduction of the enlarged cord followed, and suppuration ended; but for a year and a half afterwards, working and living well all the while, the horse continued very thin. Nothing could be felt along the cord.

Fistula of the scrotum, having cicatrized or inverted edges and discharging an ill-conditioned purulent matter, now and then accompanies the enlargement of the cord. In other cases abscess forms. This requires opening the moment it points: such having been known to open inwards, and destroy life.

The following case shows to what enormity of bulk, neglected scirrhus of the cord, and spread of the disease to the scrotum and sheath, may in time give rise.

Mr. Megginnis, V.S., Horsham, sent a tumour for examination to the Veterinary College weighing 29 lbs., which, during life, swung between the horse's thighs from side to side, like a cow's udder; and yet, large as it was, it did not interfere with the act of staling. The horse was destroyed on account of it in his fourteenth year. Mr. Megginnis knew him when but three years old, "at which time he had the appearance of being a rig, and there was always a discharge from the scrotum. For some time, the enlargement was not greater than an egg; it subsequently increased to the size of a cricket-ball." After four years more, "being better fed and not so much worked, the swelling began gradually to augment more perceptibly; but it did not affect his health," he being regularly hunted.—"The wound would occasionally cease discharging for a few days, and then break out in a fresh place; and so it continued up to the time the horse was killed." "Lately, he began to lose his cheerful look and condition, and to be rather tucked up, and to lose flesh," and, at last, to be in pain; on which account his owner had him killed.

GANGRENE may be the consequence of excessive tumefaction of the sheath, or of scirrhus of the cord, or may supervene upon peritonitis.

TETANUS may ensue either before or after the period of suppuration; arising, on occasions, it would appear probable, from the compression upon the nerve being insufficient to annihilate sensation. Certain irritable horses are most liable to this unfortunate sequel, and it has been observed to occur oftener in summer than in winter: peritonitis being the most common in winter. In both cases, however, the causes may be the same. Tetanus may result from a current of cold air interrupting the suppurative process, and occasioning metastasis. One obvious indication of cure will be to re-establish suppuration.

Hurtrel d'Arboval informs us, that at a remount dépôt for cavalry, established at Bec (*Department de l'Eure*) 24 horses were castrated in the same day, and afterwards were made, four times a day, to take a cold bath, in water derived from an eminently cold spring; and that the consequences were, sixteen out of the twenty-four died of locked jaw. In Mr. Gavin's case, to be found in 'THE VETERINARIAN,' vol. xxv, p. 429, tetanus appears to have resulted from the *heat* of the weather, which at the time of operation appears to have been excessive.

Amaurosis occurred, under D'Arboval's observation, on the fourth day after the operation, in a horse three years old, which had passed the night embedded in mud, in a ditch: but it disappeared after continuing six days. Another horse, four years old, turned out, after the operation, into low pasturage, and lying out, became amaurotic next morning: he was immediately taken into the stable, and eight days afterwards had recovered. Fromage de Feugré has likewise observed amaurosis follow castration, which was attended by hemorrhage of the cord: this likewise terminated favorably. But the most striking case of this kind is one Gohier relates.

A month after having been castrated, a horse, in his sixth year, exhibited a champignon as large as an egg. Gohier laid open the scrotum deeply, and placed above the induration well-closed clams. A small

stream of blood issued from the wound at the time, which at first was disregarded; but, half-an-hour afterwards, perceiving that the hemorrhage continued, the horse was led into a river, and allowed to remain therein for half-an-hour, up to his belly in water. The bleeding stopped, and Gohier left him; but, on his return, he found that a great deal of blood had been lost; that the pulse was very small; and that vision was extinguished, owing to an extreme dilatation of both pupils. Gohier applied some agaric powder to the vessels, and plugged the wound with tow, which he confined by sutures. The bleeding ceased, but left the animal in extreme weakness for thirty-six hours; during which cordials were administered. By degrees he recovered, and about the fifteenth day his strength returned: the pupils, however, continued still in a state of dilatation, and vision remained very defective. For four months he was kept under observation, remaining in *statu quo*; afterwards, he went to work in a cart, and at the elapse of a year died of colic.

STRANGLES, or something akin to it, has proved a sequel—I do not say a consequence—of castration, as the subjoined case will show: it must, I take it, or its *virus*, have pre-existed in the system.

Mr. Lee, V.S., Sleaford, was called to a blood-colt, who immediately after being cut had been “attacked with strangles, accompanied by ulceration of the scrotum and general œdema and debility.” The pulse was 60; the appetite gone; the penis and scrotum much swollen. Fever and diuretic medicine, and opening and fomenting the scrotum, to appearance recovered him. On the eighth day he again lost his appetite, and then a large tumour appeared to be forming on the inside of the thigh, near the scrotum. Two days afterwards, Mr. Lee opened the tumour, and let out upwards of two quarts of pus, “which flowed through the abdominal ring.” The colt thenceforth regained his appetite, and in a few days became quite on the road of recovery.

FARCY and GLANDERS followed castration in the case annexed:

In May, 1823, a three-year-old colt, the property of Mr. L., of Eltham, was cut in the usual manner, with the actual cautery, by my father. On the seventh day afterwards some pimples, perceptible only to the feel, were discovered upon the outer side of the near quarter, forming by their course a connected chain. These grew in size and assumed the appearance of farcy buds. And what increased suspicion was, that the colt halted with the limb. On the tenth day, similar pimples appeared upon

the opposite hind, and upon both fore limbs as well, and likewise upon the head and neck. All the legs then took to swell; but, most of all, the off hind, to which the lameness became transferred. Soon after, he commenced emitting purulent matter from the nostrils. Fever had been all along an accompaniment. On the twenty-sixth day from that of the operation the colt was destroyed, suffering in the last stage of farcy coupled with the supervention of glanders.

CONCLUSION OF THE SECOND VOLUME.

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